

Psp14061

EcoR V

2/154

180 270 360 450 540 8 GGAATATCAAAGTCTTCGGAATATCCATATTGGGAAAGGACAGAAGCTCCGGGGTAGTTTGATAGATGAGCTCCGGTGTATTAAATCGGG TGTTACATCTCTCGGCTACAGCTCGAGATGTGCCTGCCGAGTATACTTAGAAGCCATGCCAGCGTGTTGTTATACGACCAAAAGTCAGGG CCATGGTGGTGTCGATATCGGCAGTAGTCTTTGCCGAAACGTTGAGGGTTACAGTGATCTGCGTCGGACATACTTCGGGGAATCTACGGC CATCCAACGGACTTCTCATACCACTCATTGACATAATTTCAAACAGCTCCAGGCGCATTTAGTTCAACATGAAGCAATTCTCCGCCAAAC **ECHK!** signal sequence BssH II Bst1107 |

F/G._2A

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			BspLU111	AGGACATGTAAT	Dra I				Δ	ATACAGCCTAAA	Eco31	GGTCTCAATTAT
	AGTCA			AAATC		TATAT		ATGAG		TATGA	Nco N	TACCAT
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BsrB Bs	CGGAGCCTGT	G A C	B I Bst1107 I	CCCGAAGCAC		CCTTTCTCT		ACGTGATAG		CCATTCTAA	Ear I Sap I	тесестесе
	ACTTATTTTGGGATGACGAGCCTGTACATGGTGATCAGTCATTTCAGCCTCCC	TYFGMTS	Ppu10 l BfrB l SnaB l Sph l Bst	AGGGCATGCATGTACGTATACCCGAAGCACATTTTTCGGTAAATCAGGACATGTAAT		CACCATAAGCCTTGAGGTTGCCTTTCTCTTTTGATTGTGAATATATAT		NAACCCATCATAGATTGTGTCACGTGATAGACCCCTTGAATGATGAGCGAAATGTATCA		ACAGTCAGAATACACCAACC	Bg	CAACCTTTCAGATCTCGTTTTGCGCTGCGAAGAGCTAGCT
Fsp I	AGGGCGGACAGGGTGTGAATAATGCGCACACGA	0 G G O G V N N A H T		CGAGTGTACCAGGAAGATGGATGTCCTGGAGA	BstE II	AAGTTCCTTCCATGAATAGATATGGTTACCCT	EcoR V	TGACAGATATCTCTAAACACCTTATCCGCTTA	Dra I	GTCCCGTTTAAATCAAACCCTTTCAGCCTAGCACAGTCAGAATACACCCCATTCTAAGGTAGTACTAAATATGAATACAGCCTAAA	Bfr8 I	TGCATCGCTATATGATCCCATAAAGAAGCAAC

FIG._2D

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	BspLU11 BsrG I	BamH I Xma I Sma I	
GAGTGGAGCGTTTAGTCTCGTTTAAGCCTAGCTATCTTATAAGGACAACACATGTACATGGGCTTACTTGTAGAGAGGTAGGATCCCGGG	CTTATAAGGACAACACATGTACATGGG		1980
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; cttcttcacatctcgaggagttgtctacacgtcgcgtccatgtcataagccggtactcgacgttgtcgtgaccgtgacccagaccctgt	GTCCATGTCATAAGCCGGTACTCGACG		2070
	NCO	ol BsaB1	
TGATAGCGTTGAGAAGGCCCTATATTTGAATTTCC	.AATCTCAGCTTTACGAAGATATGCCCA	TTCCAATCTCAGCTTTACGAAGATATGCCCATGGTGGAGGGTTAGTAAACCGATGATGA	2160
Eco311 Msc I		BspLU111	
TCGTGTGCAGCATGAGATGGCGTGGCCAATCCTGTTCAAATGCCAAGACCCGCCTCCTACCACATGTAAGGCATCCGTCGGCCGCAC	TETTCAAATGCCAAGACCCGCCTCCTA		2250
	Xcm I	Msc I BsrD I	_
GTTGAATTGTGCAAATGCCGAGATCATAAAAGCGGCCACACTTCCACGTCGGTACTGGATGGGTTGCGCGTGGCTACTGTGTTTTCCA	SCCACACTTCCACGTCGGTACTGGATGG		2340
	Alwn I	Ear I Vsp I	
TTGCGTGGGTCGTTCGTGTTACTGCGACGCAGATTCTGTAGGCAAGGCGCAGGGCTCTCTTCTGAGGTAGAAAACACCCCATATTAATCT	rcreragecaagececaegecrcrcrrc	. ,	2430

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+

CCATGGTGGTGTCGATATCGGCAGTAGTCTTTGCCGAAACGTTGAGGGTTACAGTGATCTGCGTCGGACATACTT

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Talgeten 🔾 🖳 💆 🗍 🖳 Expression of Genes Encoding Cell Wall..." SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 7 of 154

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CATGGTCTCAATTATGAGTGGAGCGTTTAGTCTCGTTTAAGCCTAGCTATCTTATAAGGACAACACATGTACATG GCAGCAAAGAAATAATCACCGTCTTCCGTGGCACTGGTAGTGATACGAATCTACAACTCGATACTACTACACCC **TCCAGGACCAAGTCGAGTCGCTTGTCAAACAGCAGGTTAGCCAGTATCCGGACTATGCGCTGACTGTGACGGGCC ACAGGTATGCCCTCGTGATTTCTTTCAATTAAGTGTATAATACTCACTAACTCTACGATAGTCTCGGAGCGTCCC** TGGCAGCACTCACTGCCGCCCAGCTGTCTGCGACATACGACAACATCCGCCTGTACACCTTCGGCGAACCGCGCA **ACTGGAGCGTTGATCCTTACAGCGCCCAGAACACATTTGTCTGCACTGGGGATGAAGTGCAGTGTGAGGCCC AGGGCGGACAGGGTGTGAATAATGCGCACACACTTATTTGGGATGACGAGCGGAGCCTGTACATGGTGATCAG GAGGTTGCCTTTCTCTTTTGATTGTGAATATATATTTAAAGTAGATGACAGATATCTCTAAACACCTTATCCGCT** TAAACCCATCATAGATTGTGTCACGTGATAGACCCCTTGAATGATGAGCGAAATGTATCAGTCCCGTTTAAATCA **AACCCTTTCAGCCTAGCACAGTCAGAATACACCCCATTCTAAGGTAGTACTAAATATGAATACAGCCTAAA GGCTTACTTGTAGAGAGGTAGGATCCCGGGCTTCTTCACATCTCGAGGAGTTGTCTACACGTCGCGTCCATGTCA** TAAGCCGGTACTCGACGTTGTCGTGACCGTGACCCAGACCCCTGTTGATAGCGTTGAGAAGGCCCTATATTTGAA TTTCCAATCTCAGCTTTACGAAGATATGCCCATGGTGGAGGGTTAGTAAACCGATGATGATCGTGTGCAGCATGA GATGAGACCGTGGCCAATCCTGTTCAAATGCCAAGACCCGCCTCCTACCACATGTAAGGCATCCGTCGGCCGCAC GTTGAATTGTGCAAATGCCGAGATCATAAAAGCGGCCACACTTCCACGTCGGTACTGGATGGGTTGCGCGTGGC GATAGATGAGCTCCGGTGTATTAAATCGGGAGCTGACAGGAGTGAGGCGTCATGTAGACCATCTAGTAATGTCAGT CGCGCGCAATTTCGCACATGAAACAAGTTGATTTCGGGACCCCATTGTTACATCTCTCGGCTACAGCTCGAAAGATG TGCCTGCCGAGTATACTTAGAAGCCATGCCAGCGTGTTGTTATACGACCAAAAGTCAGGGAATATGAAACGATCG **CATCCAACGGACTTCTCATACCACTCATTGACATAATTTCAAACAGCTCCAGGCGCATTTAGTTCAACATGAAGC AATTCTCCGCCAAACACGTCCTCGCAGTTGTGGTGACTGCAGGGCACGCCTTAGCAGCCTCTACGCAAGGCATCT** CCGAAGACCTCTACAGCCGTTTAGTCGAAATGGCCACTATCTCCCAAGCTGCCTACGCCGACCTGTGCAACATTC GCGGCAATCAGGCCTTCGCGTCGTACATGAACGATGCCTTCCAAGCCTCGAGCCCAGATACGACGCAGTATTTCC **GGGTCACTCATGCCAACGACGGCATCCCAAACCTGCCCCCGGTGGAGCAGGGGTACGCCCATGGCGGTGTAGA** <u> ATACTGTGTTTTCCATTGCGTGGGTCGTTTCGTGTTACTGCGACGCAGATTCTGTAGGCAAGGCGCAGGGCTCTCT</u> CGGGGAATCTACGGCGGAATATCAAAGTCTTCGGAATATCCATATTGGGAAAGGACAGAAGCTCCGGGGTAGTTT **TCTGAGGTAGAAAACACCCCATATTAATCTGAATTC**



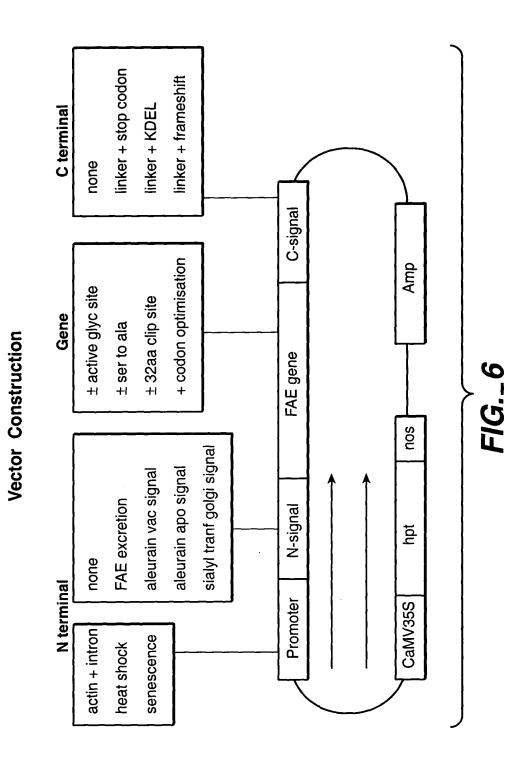
"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeton and Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

Docket No. GC648-2

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"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by a getter of the Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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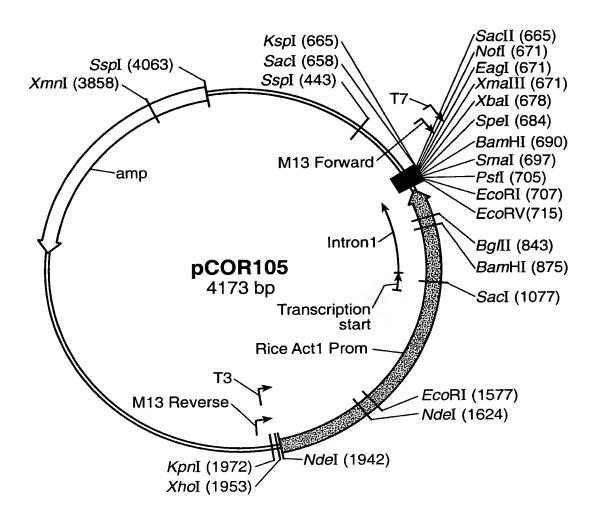
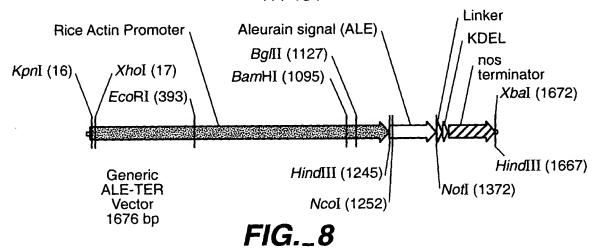


FIG._7



"Manipulation of the Phenolic Acid Content and
Digestibility of Plant Cell Walls by Pargeted 1209 . 070202 Expression of Genes Encoding Cell Wall..." SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 11 of 154

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KDEL-COOH ER retention sequence

NotI

A A K P L K D E GCGGCCGCGA AACCACTGAA GGATGAGCTG TAA

FIG._9

FAE-LINKER-FRAMESHIFT Structure and Sequence

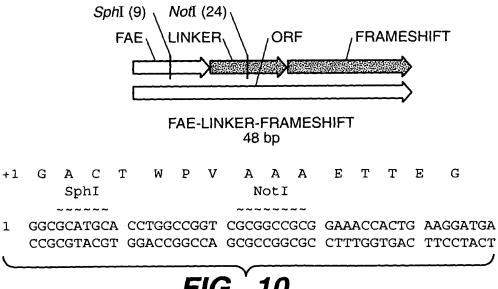


FIG._ 10



"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targetida 1209 a DF D 20 Expression of Genes Encoding Cell Wall..." SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 12 of 154

See1	1	UB8.1				,	,	,	,	,	ı	ı	PJQ5.2	•		FIG1
H.S.	1	UK3	UK12	UK13	UK6	UC5.1	UK2	UH10	UH11	SK1	•	,	,	ı *		Linker KPLKDEL
Actin	(+hyg)	OH4	OH6	UH7	UHS	НОХЗ	UH3	UH8	0H9	UF1	ı	pJQ4.9*	pJQ3.2*	pJO6.3*		((
	Target (VAC	АРО	APO	VAC	VAC	VAC/E.R.	E.R.	д. Э.	щ Я.	APO	GOLGI	APO	VAC	CO Site)	Linker Frameshift
40				,				ı	1	į.	1		1	1	stored N(Stop codon
Plant Transformation Cassettes								///// 編編	111111 総額	////// 概					Promoter (Kpn1-EcoR1 Deletion and Restored NCO Site)	FAE
Plant Trans											-	-			er (Kpn1-Eo	Aspergillus Signal
	in + hyg	}	ł	1	ł	<u>@</u>		1	1	1	1	}	ļ	}		PPI Signal
	Original Actin + hyg	TR9.4	TR5.5	•	•	TR8 (glycos)	•	1	ı	TR6.1	TR2				* - Modified Actin	RST Signal
ectors,	HS	173	•	ı	•	,	•		1	TT2	•				<i>2</i> *	Aleurain NPGR
Initial Vectors	Original Actin	TP11.1	115	UA4.4	TP8.5	TP3.1	TU4	TUS	ne	TP5.1	TP4	TP3.1	TP3.1	TP3.1		Aleurain



"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted Sexpression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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Vectors

Original Actin promoter in pCOR105

	Target	Signal sequences	Vectors
(i)	APO	- aleurain-NPGR-FAE	pUH6, pTT5, TT5.5, pTT5.1
		- aleurain-delNPIR -FAE	pUH7, pUA4.4,
(ii)	ER	- aleurain-NPGR-FAE-linker-KDEL	pTU5, pUH8,
		- aleurain-delNPIR-FAE-linker-KDEL	pUG4, pUH9,
(iii)	VAC	- aleurain-NPIR-FAE	pTP11.1, pTR9.4, pUH4, pUK3,
(iv)	ER/VAC	- aleurain-NPIR-FAE-linker-KDEL	pTU4, pUH3,
(.v)	VAC	- aleurain-NPIR-FAE-linker-frameshift	pUA1K3, pTP3.1, pUC5.11
(vi)	VAC	- aleurain-NPIR-FAE-linker-stop	pTP8.5, pUH5
(vii)	ER	- Aspergillus signal -FAE-KDEL	pTP5.1, pTP6.1, pUF1,

Modified actin promoter (Kpn1-EcoR1 deletion and restored NCO site)

(i)	VAC	- aleurain-NPIR-FAE-linker-frameshift	pJ06.3
(ii)	GOLGI	- RST-FAE-linker-frameshift	pJQ3.2
(iii)	APO	- PPI-FAE-linker-frameshift	pJQ4.9

Heat-shock promoter

(i)	APO	- aleurain-NPGR-FAE	pUH12
		- aleurain-delNPIR-FAE	pUH13
		- Aspergillus signal-FAE	pTP4a2, pTR2.22,
(ii)	ER	- aleurain-NPGR-FAE-linker-KDEL	pUH10
		- aleurain-delNPIR-FAE-linker-KDEL	pUH11
(iii)	VAC	- aleurain-NPIR -FAE	pUK3,pTT3
(iv)	ER/VAC	- aleurain-NPIR-FAE-linker-KDEL	pUK2
(v)	VAC	- aleurain-NPIR-FAE-linker-frameshift	pUC5.11, pHOX3
(vi)	VAC	- aleurain-NPIR-FAE-linker-stop	pUK6
(vii)	ER	- Aspergillus signal -FAE-KDEL	pUK1, pTT2

Senescence promoter

(i)	APO	- See1-PPI-FAE-linker-frameshift	pJQ5.2
(ii)	VAC	- See1-aleurain-deleted NPIR-FAE	pUB8.1

FIG._12



"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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ALEURAIN-NPIR (Vacuolar) and NPGR (Apoplast) Structure and Sequence

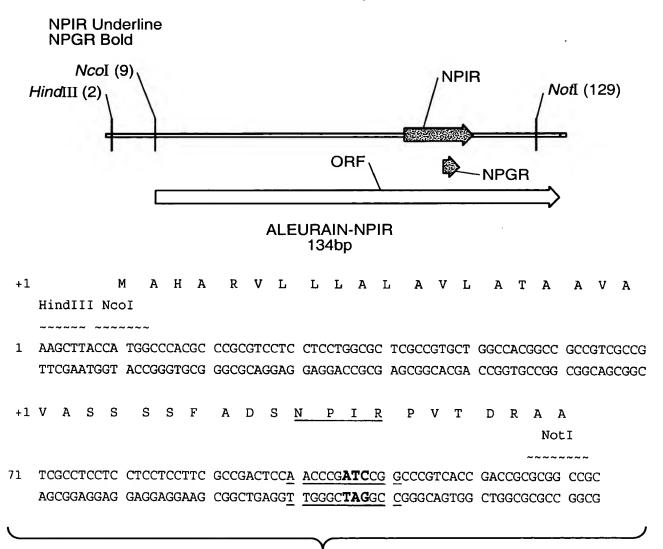


FIG._ 13



Expression of Genes Encoding Cell Wall..." SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 15 of 154

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RAT SIALYL TRANSFERASE Golgi signal sequence

HindIII ----

Ø AAGCTTACCA TGATCCACAC CAACCTCAAA AAGAAGTTCT CCCTCTTCAT CCTCGTCTTC CTCCTTCG (z, H > ы Ŋ Н

CCGTGATCTG CGTGTGGAAG AAGGGCTCCG ACTACGAGGC CCTCACCCTC CAAGCCAAGG AGTTCCAAAT O 4 œ Н H ы ø E × А ഗ Ö ĸ × 3 > U н 71

252255255 NotI

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POTATO PROTEASE INHIBITOR II Apoplast signal sequence

HindIII

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AAGCTTACMA TGGMCGTGCA CAAGGAGGTS AACTTCGTSG CCTACCTCCT GATCGTSCTC Ö ᆸ > H IJ ø > Z 口 二 GGCCTCCTCT

Ncol

22222

CGCCATGGAG CACGTGGACG CCAAGGCCTG CACCCKCGAG TGCGGCAACC O U 闰 × H U 4 × ď А > 耳 闰 Z TGCTCGTSTC ß . ტ G

П

Z

TCGGCTTCGG

71

NotI

CATCTGCCCG GCGGCCGCC ø Ø U 141

16 / 154 Targ ting Expression of gfp to Differ nt Cell Compartm nts

Actin Promoter Targeting Vectors

- cccccccccc	VAC

Actin Promoter	Aspergillus signal
----------------	--------------------

- Aleurain signal (NPIR) Aleurain signal I (del NPIR)
- Aleurain signal (NPGR) linker + stop codon
- linker + KPLKDEL Potato protease inhibitor
- silyl transferase

FIG._ 16A

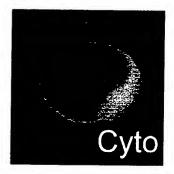


FIG._16B



FIG._16C

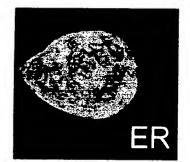


FIG._16D



FIG._16E

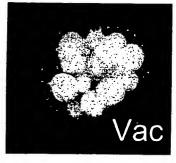


FIG._16F

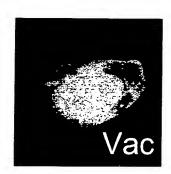


FIG._16G

FAE Activity in Transgenic *Festuca arundinacea* Leaves of Different Ages Under ER and APO Targeting Sequence

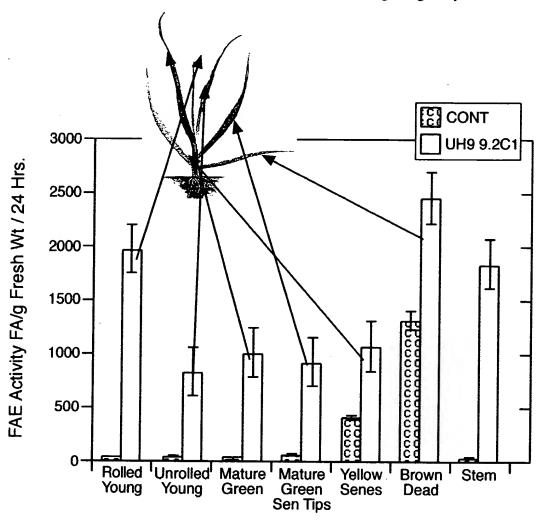


FIG._17A

Tissue

FAE Activity in Transg nic *F stuca arundinac a* L aves of Different Ages Under ER and APO Targeting Sequence

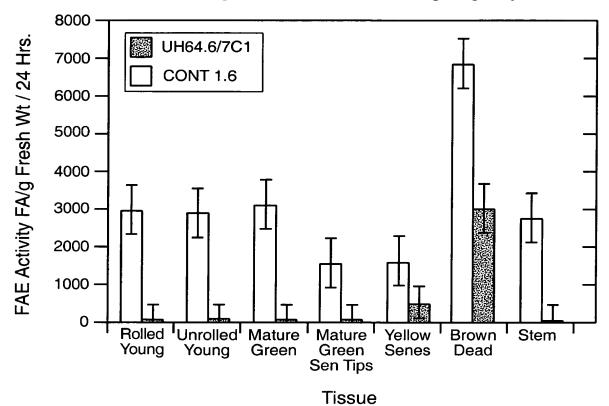
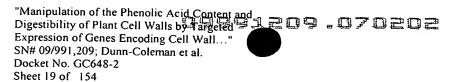
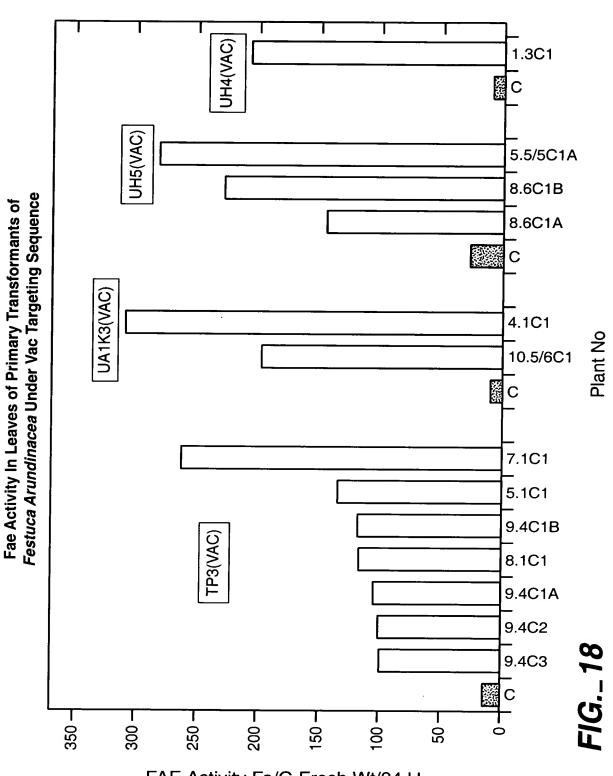


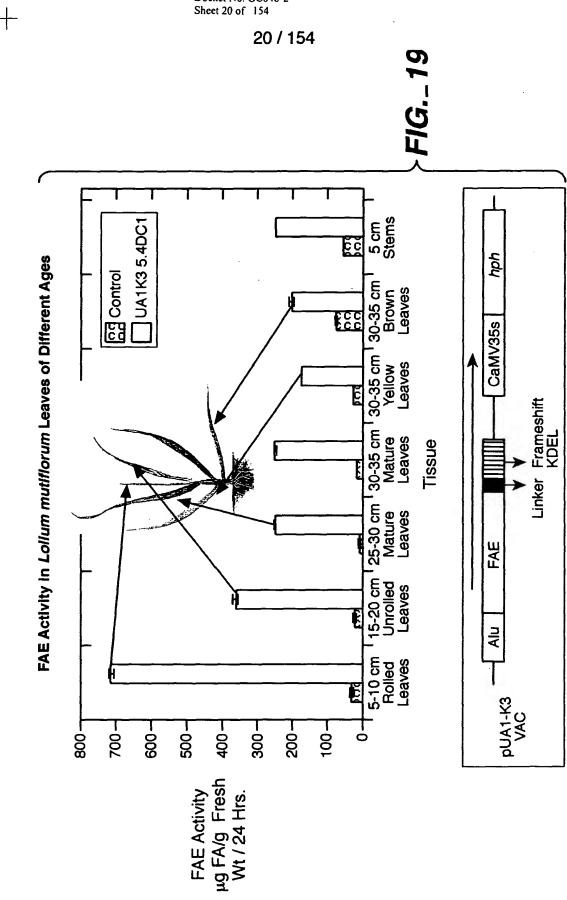
FIG._17B







FAE Activity Fa/G Fresh Wt/24 H



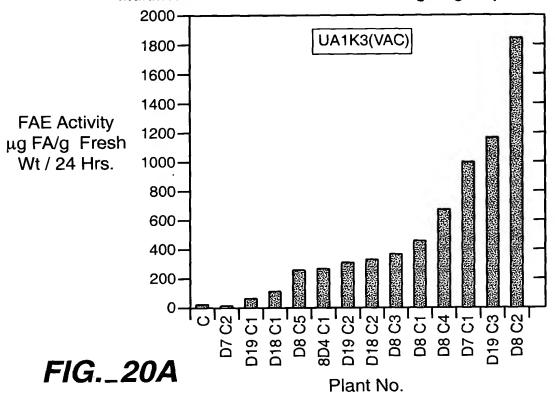
"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

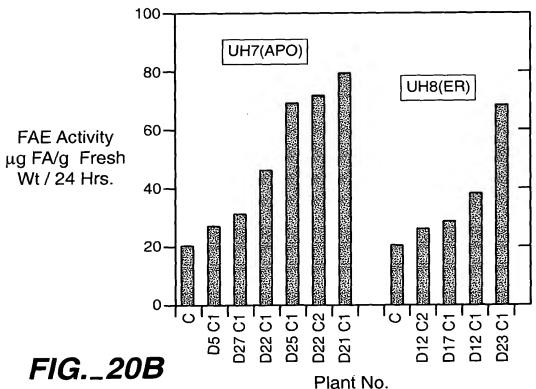
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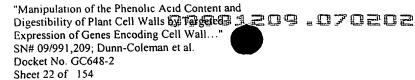


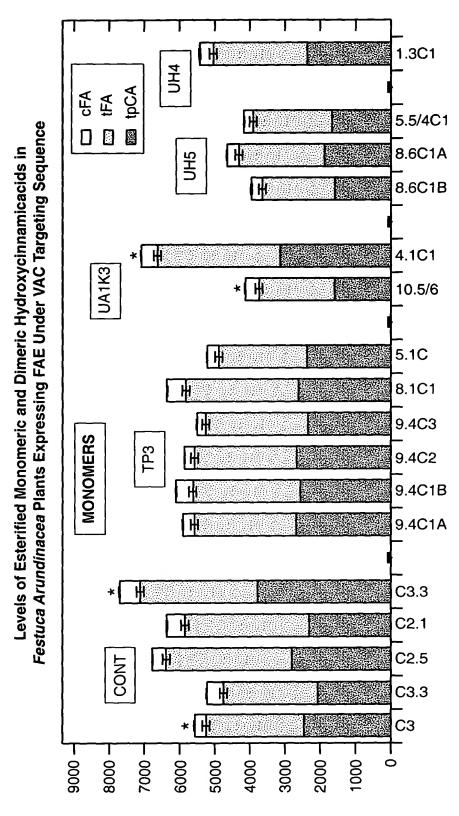
FAE Activity in Leaves of Primary Transformants of *Lolium* multiflorum Under VAC APO and ER Targeting Sequence



FAE Activity in Leaves of Primary Transformants of *Lolium* multiflorum Under VAC APO and ER Targeting Sequence







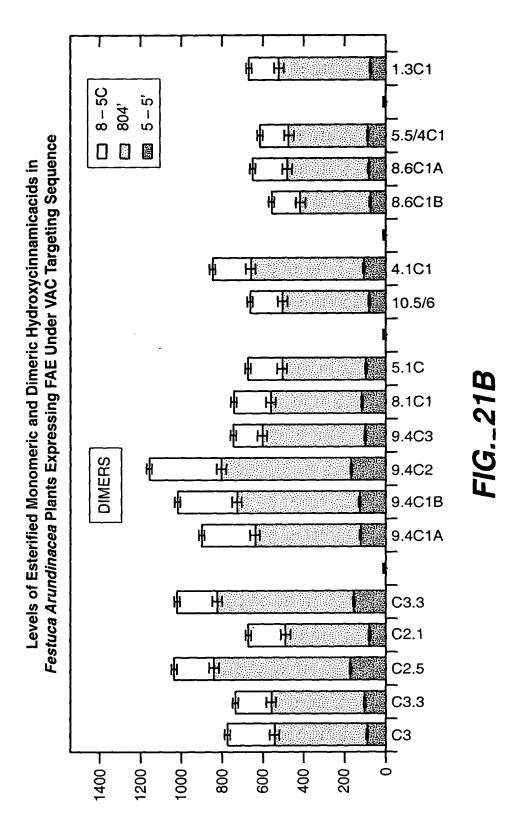
ug Hydroxycinnamic Acids g DM-1

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted 1209 2070202 Expression of Genes Encoding Cell Wall..."

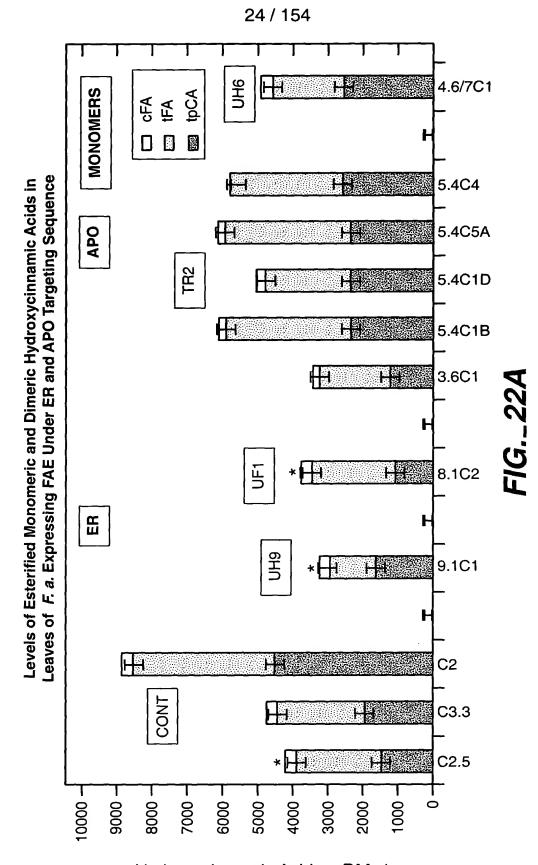
SN# 09/991,209; Dunn-Coleman et al.

Docket No. GC648-2

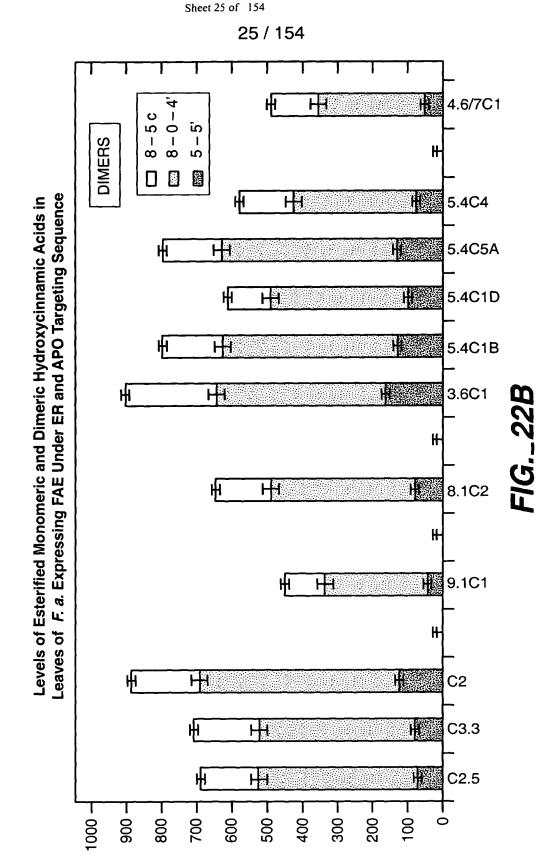
Sheet 23 of 154



ug Hydroxycinnamic Acids g DM-1



ug Hydroxycinnamic Acids g DM-1

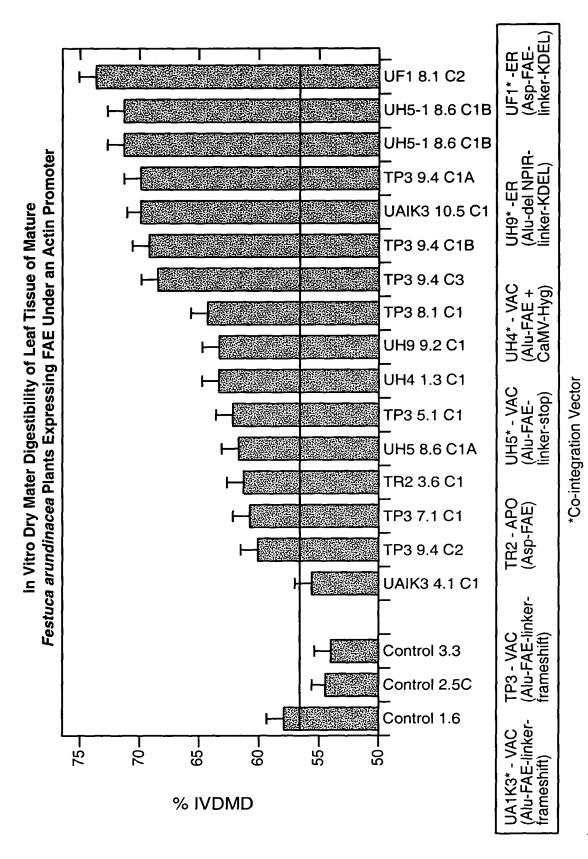


ug Hydroxycinnamic Acids g DM-1

SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2

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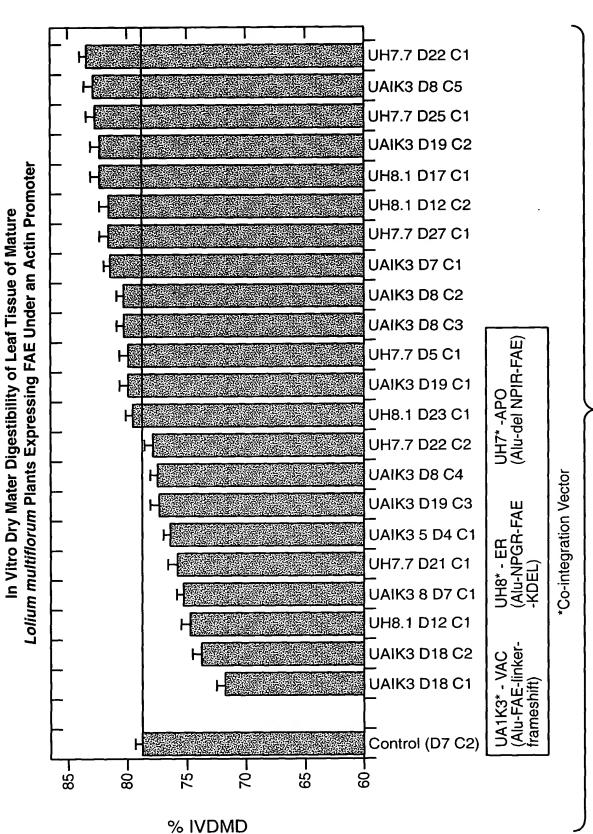
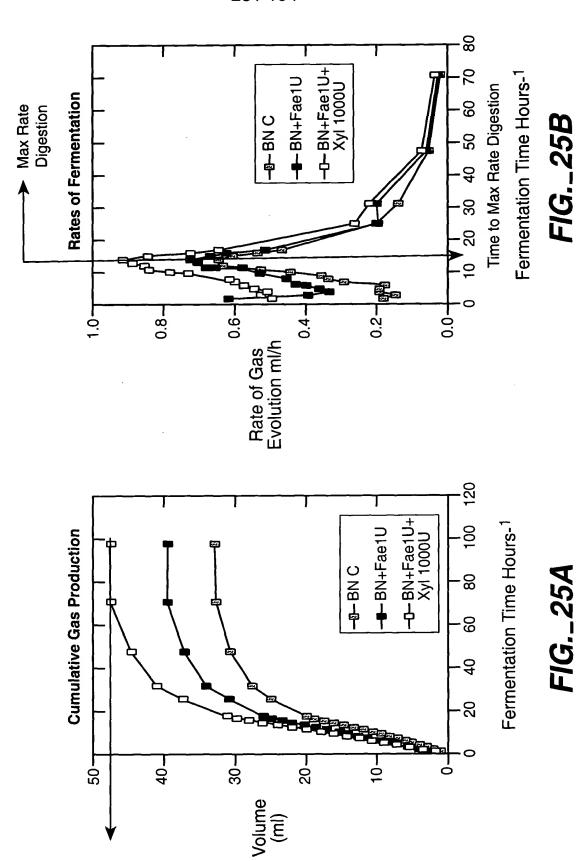


FIG. 24







"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targett 1 Plant Cell Walls..." Expression of Genes Encoding Cell Wall..." SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 29 of 154

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In-vitro Fermentation of Festuca arundinacea C II Walls From C II Cultures Expressing Recombinant FAE1

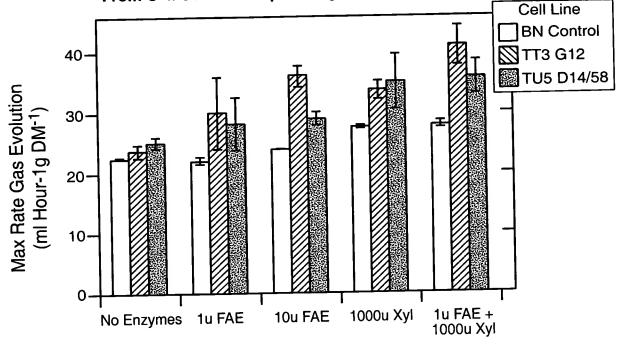


FIG._26A Maximum Rate of Digestion

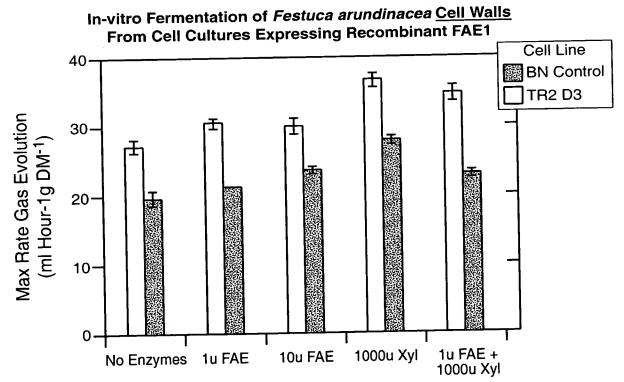


FIG._26B Maximum Rate of Digestion

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Wall Dy Targeted Suppression of Genes Encoding Cell Wall..."

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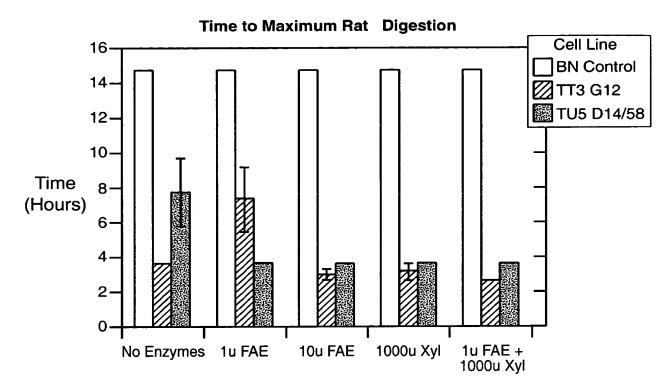


FIG._27A

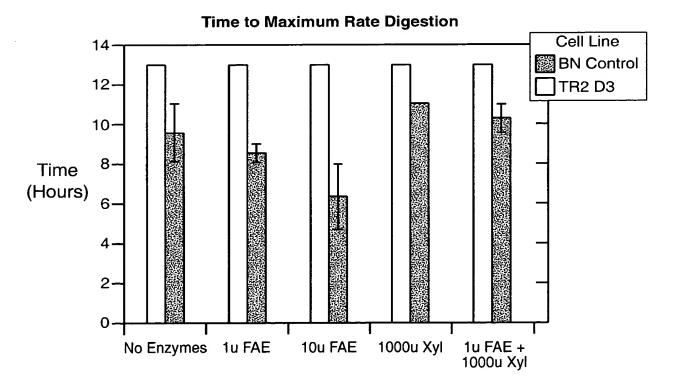


FIG._27B

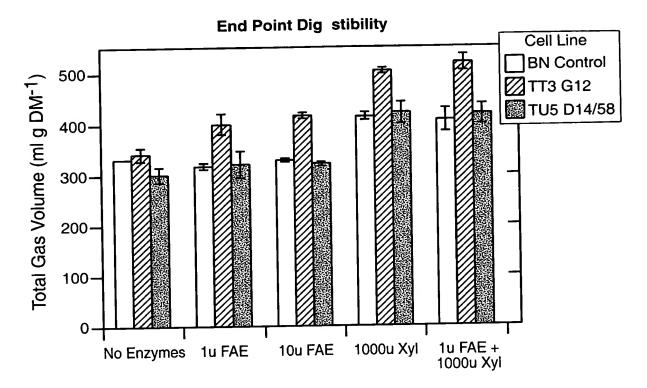


FIG._28A

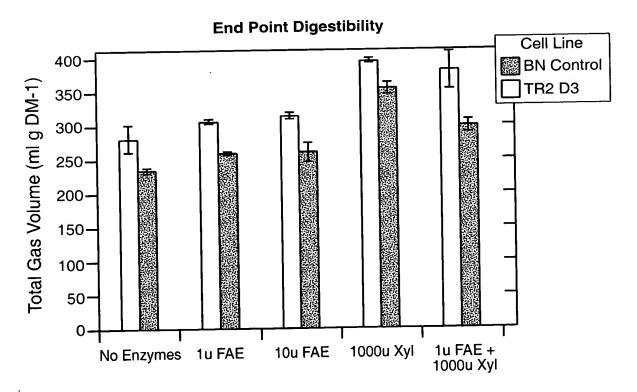
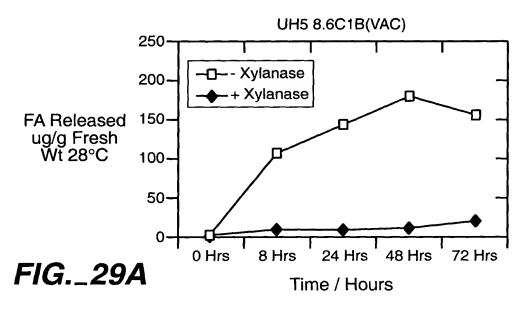
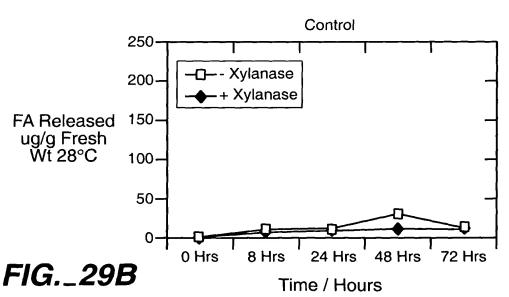


FIG._28B

Kinetics of FAE Activity by Ferulic Acid Release from Cell Wall under Self Digestion in *Festuca arundinacea* and Stimulation by Xylanase



Kinetics of FAE Activity by Ferulic Acid Release from Cell Wall under Self Digestion in *Festuca arundinacea* and Stimulation by Xylanase.



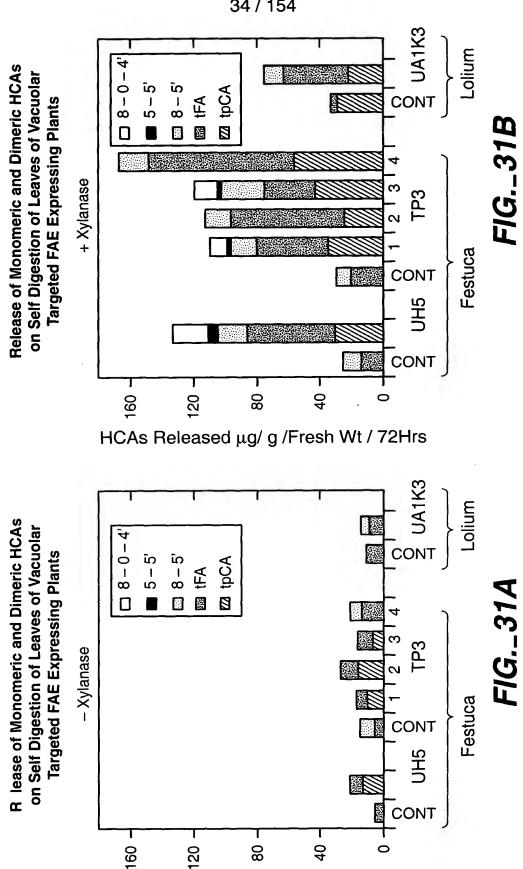
"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls Taggled 1 2 2 9 2 0 7 0 2 0 2 Expression of Genes Encoding Cell Wall..." SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 33 of 154

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GUS Activity Under the Lolium See1 Senescence Promoter in Leaves of Transgenic Plants of Lolium multiflorum 6 Green Leaves 5 Yellow Leaves 4 **GUS Activity** (Lum. Unit / 3-100 mg) 2-1 LG1 LG4 LG5 Vector Control Control

FIG._30





HCAs Released µg/ g /Fresh Wt / 72Hrs

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by fragened Texpression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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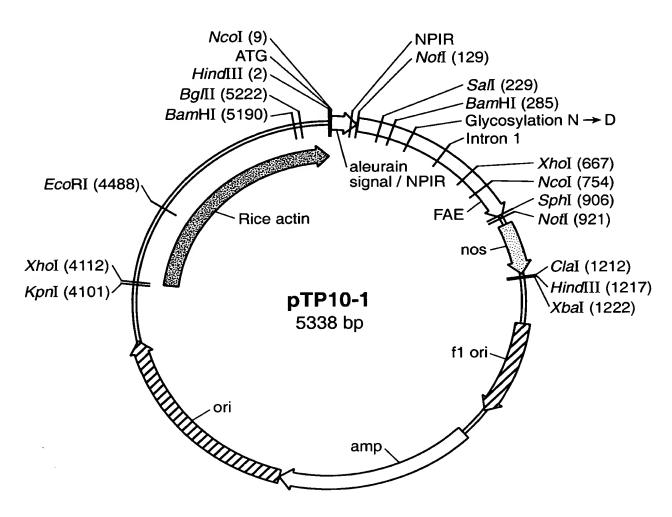


FIG._32A

Expression of Genes Encoding Cell Wall..." SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 36 of 154

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TCCGAAGACC TCTACAGCCG TTTAGTCGAA ATGGCCACTA TCTCCCAAGC TGCCTACGCC GCAGGGCATC

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GACATTAACG TTCTCAAACT Ø AAGGGAGAGA AAATTTACAA ĸ 国 Ö ĸ GACTATTATC GACCTGTGCA ACATTCCGTC Z U 211

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G T G S D T N GGCACTGGTA GTGATACGAA CGTCTTCCGT ĸ Ē CCGCGACGAC AGCAGCAAAG AAATAATCAC 臼 × Ø Ω A A ĸ GATGGATCCT ≥ 281

Glycosylation

TCTGCGACAT ACGACAACAT CCGCCTGTAC ACCTTCGGCG AACCGCGCAG CGGCAATCAG TTGTGAAGTA CCTCGGCGCC TCCCTGGCGG CACTCACTGC M U CACGGTGGAT ATTATATTGG ATGGGTCTCC GTCCAGGACC AAGTCGAGTC GCTTGTCAAA GATACTGACT ACACCCTCAC GCCTTTCGAC ACCCTACCAC AATGCAACGG Ö U O **₹** ט O GGACTACGCG CTGACCGTGA CCGGCCACKC r T O Ö E 3 H 4 А GCCAGTATCC CGCCCAGCTG TCTACAACTC 0 Ü O O 421 561 351 491

TTGAATTACG TTAGAGTCCC

CATTTGGCAA

CGCGCAAACT AGGATAAATT ATCGCGCGCG

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H GCCCAGATAC GACGCAGTAT TTCCGGGTCA O H Д ß Ø GCCTTCGCGT CGTACATGAA CGATGCCTTC 4 Σ

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CTCATGCCAA CGACGGCATC CCAAACCTGC CCCCGGTGGA GCAGGGGTAC GCCCATGGCG GTGTAGAGTA 闰 Ö 222222 NCOL H 4 Ö 闰 щ Z Н Ö Z ď Ħ

CIGGAGCGIT GATCCTTACA GCGCCCAGAA CACATTIGIC IGCACTGGGG AIGAAGIGCA GIGCIGIGAG

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GCATGCACCT ບ 4 A Q G G Q G V N N A H T T Y F G M T S G GCCCAGGGCG GACAGGGTGT GAATAATGCG CACACGACTT ATTTTGGGAT GACGAGCGGC

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KDEL Noti

GGCCGCGGAA ACCACTGAAG GATGAGCTGT AAAGAAGCAG ATCGTTCAAA GTTTTTATGA ATAATTTCTG TGATTATCAT TATGAGATGG GGTCTTGCGA TTAAGCATGT AATAATTAAC ATGTAATGCA TGACGTTATT TCCTGTTGCC TAAGATTGAA 4 4 GGCGGGTCGC TAAAGTTTCT 981 1051

HindIII

CGATAGAAAA CAAAATATAG

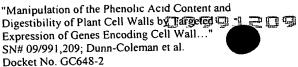
ATTTAATACG

GCAATTATAC

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XbaI 22222

9990990909 CGTTACCCAA ACCGATCGCC CCTATAGTGA TIGCAGCACA TCCCCCTTTC GCCAGCTGGC GTAATAGCGA AGAGGCCCGC TCTAGAGCGG CCGGTGGAGC TCCAATTCGC AAAACCCTGG GGCGCATTAA CGTGACTGGG GTTGCGCAGC CTGAATGGCG AATGGGACGC GCCCTGTAGC TTTACAACGT TGTTACTAGA TCGATAAGCT TGGCCGTCGT GCGCGCTCAC CTTAATCGCC GTGTCATCTA GTCGTATTAC CTTCCCAACA 1261 1331 1191 1401

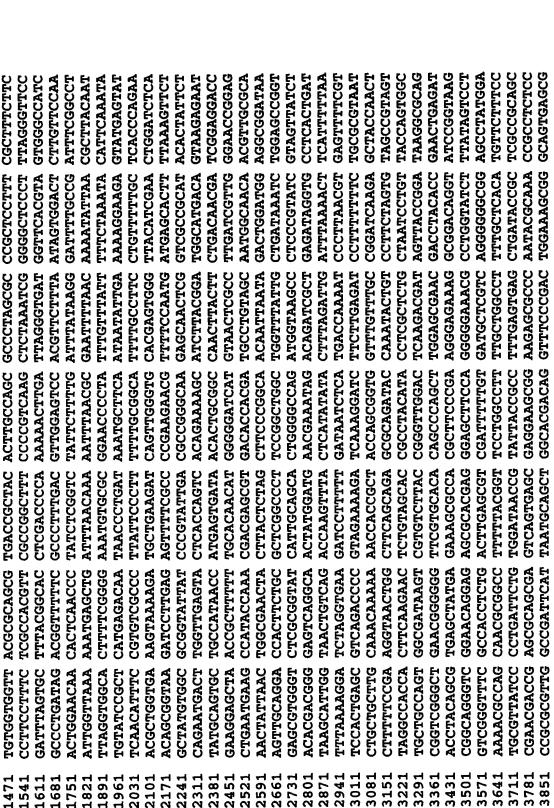


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3921 CAACGCAATT AATGTGAGTT AGCTCACTCA TTAGGCACCC CAGGCTTAC ACTTTATGCT TCCGGCTCGT 3991 ATGTTGTGTG GAATTGTGG GAATACCAA TTTCACACAG GAACAGCTA TGACCATGAT TACGCCAAGC KBD11													
CAACGCAATT AATGTGAGT AGCTCACTCA TTAGGCACC CAGGCTTTAC ATGTTGTGTG GAATTGTGAG CGGATAACAA TTTCACACAG GAAACAGCTA KDDI GCGCAATTAA CCCTCACTAA AGGGAACAAA AGCTGGGTAC CGGGCCCCC TGAGAAGAGA GTCGGGATAG TCCAAAATAA AACAAAGGTA AGATTACCTG TTATAAAAAT TGAGGATGT TTGTCGGTAC TTTGATACGT CATTTTGTA TTCGCGATT GGAAATGCAT ATCTGTATTT GAGATGCTA TTAAGTTCGT GATTTGTAAA AGAAATACT TTAAAAAAC CATTTGATAACGT TTCTAGTAAA AGAAATACT TTAAAAAAC CATTTGATAACATA TCCAGGCGAAT TCCACAATGA ACAATAATAA GATTAAAAACAA AAAAAAAAA AAGAAAAGATA AACTTAGAC CACCCAACCC ACTGGCAAAT GCACGATCC TAGCAAGCC AGCCCAACCC ACTGGCAAAT GCACGATCC CCCGGCACTTT ACAAAAACAA AAAAAAAAAA AAGAAAGAAA AAAAAAAAA AAAAAAAA	TCCGGCTCGT TACGCCAAGC	TTCATATGCT AAAACATCAG TTTTCTACTA	TTTAAGTTTA	AAATATATAT	TGGGTATTTT CCTAAAGCCC	AGTGCAGCCA	GGGCCGGAAA	CCACCTCCTC	CCCCGCCCT	CCGGGCGTGA		TTTTGTGGTA	GCAGCCTCGT
CAACGCAATT AATGTGAGTT AGCTCACTCA TTAGGCACCC ATGTTGTGTG GAATTGTGAG CGGATAACAA TTCACACAG GCGCAATTAA CCCTCACTAA AGGGAACAAA AACAGGTA TTAAAAAGGTG GTATAAGTAA AATATCGGTA ATAAAAGGTG TTATAAAAGGTG GTATAAGTAA AATATCGGTA ATAAAAGGTG TTCCGCGATTT GGAAATGCAT ATCTGTCGTAC TTTGATACGTT TTCCGCGATTT GGAAATGCAT TTGTCGGTAC TTTGATACGTT GATTTGTATA AGAAATACT TTAAAAAACC CATATGCTAA ECORI CACCCATATAAA ATAAAAGATA ACAATAATAA GATTAAAATT AAAAGTGCTAA ACCACGACCC AGCCCAACCC ACTGGCAAAT AGTCTCCACC CCCGGCACTT AAAAAAAAAAA AAGAAAAGAAA AAAAAGAAAA AGAAAAAA	ACTTTATGCT TGACCATGAT XhoI	CTCGAGGTCA GTCAAAAGTG AAATTTACTC	TGAATTGTT TGCTTTTGTA	TTTTGAGAA	GTTGCAGCGA CCCCTAAAGT	AACCCACCCC	CGGGTCGTGG	ACCACCACCA	CCGGTAACCA	GCTGGCGTCT		TCTTTCTTCT	TGTGACAAAT
CCACCCAATT AATGTGAGTT AGCTCACTCA ATGTTGTGTG GAATTGTGAG CGGATAACAA TGAGAAGAGA GTCGGGATAG TCCAAAATAA TTAAAAAGTG GTATAAGTAA AATATCGGTA TTATAAAAAAT TGAGGATGTT TTGTCGGTAC TTCGCGATTT GGAAATGCAT ATCTGTATTT GATTTGTATA AGAAATGCAT TTAAAAAACC ECORI CCCCTAT GCAAATGA ACATAATAA TTCTAGTAAA ATAAAAGATAA TTCTAGTAAA ATAAAAGATA AACTTAGACT AAAGTGCTAT GCACGATCCC CCCGGCACTA AAAAAAAAA AAGAAAGAAA AAAAAGAAAA AGCGAGGAG ATCGCGACCC CCCCTCGCT GCCGGACGAC CCCCTCTTTC TTTTTTTTG AAAAAAAAAA AAGAAAGAAA AGGAGGACGAC CCCCTCGCT GCCGGACGAC CCCCTCGCT GCCGGACGAC GAGCTT CGTCGCCCAG GAGCTT CGTCGCCCAG GAGTTTGAAT CCTCCTCCCC CCCCTCGCT CGTCGCCGG GAATTTGAAT CCTCCTCGC GAATTTGAAT CCTCCTCGG	CAGGCTTTAC GAAACAGCTA	CGGGCCCCCC AGATTACCTG	CATTTTGTA	TTTGACATAA	GCTTGCCCCC	AACCCAACCC	CAGGTGGGTC	CCCTACCACC	TCCCCCCCCG	GGATCTCGCG	1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	AGATCTTCTT	TTTCATGATT
CCCCCCGCATT AATGTGAGTT ATGTTGTGTG GAATTGTGAG GCGCAATTAA CCCTCACTAA TGAGAAGAGA GTCGGGATAG TTAAAAAAT TGAGGATGTT TTCGCGATTT GGAAATGCAT GATTTGTATA AGAAATACCAT ECORI CCCCCAATTA AGAAATACCA AAGGGCAAT TCCACGATCA TTCTAGGAAT AGAAATACC CCCCCAATAAAAAAAAAAAAAAAAAAAAAA	TTAGGCACCC TTTCACACAG KpnI		TTTGATACGT	CATATGCTAA	GATTAAAATA CAAAACATTT	AGCCCAACCC TCACCGTGAG	AGAAAAACAG	ATCCCCCCAA	CCCCTCCCCC	GGGAGGGGCG		TCTCGGATGT	TAGTTTTTCT
CCCCCCGCATT ANALOGO CONTROL CO	AGCTCACTCA CGGATAACAA	AGGGAACAAA TCCAAAATAA AATATCGGTA	TTGTCGGTAC	TTAAAAAACC	ACAATAATAA AACTTAGACT	TAGCAAGCCC	AAAAAGAAAA	CTCTCCTCC	GAGCTCCTCC TTTTTTTCG	ATCGGTGCGC		GGAATGGGGC	TGTTCATCGG
	aatgtgagtt Gaattgtgag	CCCTCACTAA GTCGGGATAG GTATAAGTAA	TGAGGATGTT		TCCACAATGA ATAAAAGATA	GCACGATCCA	AAGAAAGAAA	ATACCCCCC	GCCGGACGAC	CGTCGCCCAG	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	ATCCTCGCGG	CCCTCAGCAT
39921 39921 39921 44444 45201		GCGCAATTAA TGAGAAGAGA TTAAAAGGTG	TTATAAAAT TTCGCGATTT	GATTTGTATA ECORI	TCAGGCGAAT	AAAGTGCTAT ACTGGCAAAT	AAAAAAAAA	CACTATATAC	CCCCCTCGCT	AGAGCGGCTT	1 2	GTCGGCCCGG	GAATITGAAT CCCTCAGC GCGGAGCTTT TTTGTAGC
	3921 3991	4061 4131 4201	4271 4341	4411	4481 4551	4621 4691	4761	4901	4971 5041	5111		5181	5251 5321

FIG._32E

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted 1 2 0 7 0 2 0 2 Expression of Genes Encoding Cell Wall..." SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 40 of 154

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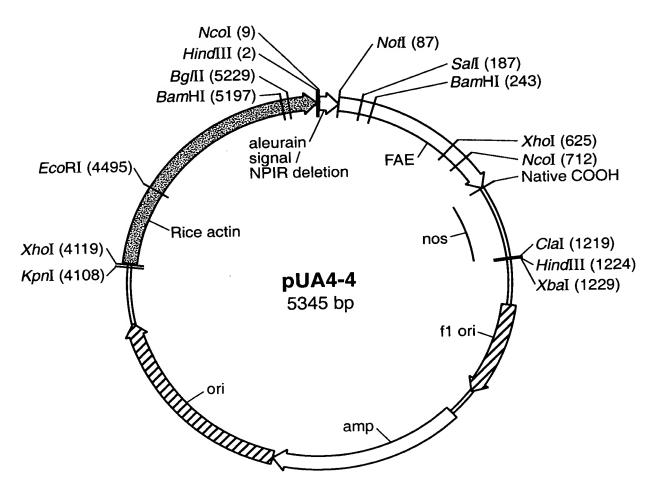


FIG._33A

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GCCGTCGCCG GGCCACGGCC H 4 TCGCCGTGCT > 4 Н CTCCTGGCGC ď Н CCGCGTCCTC > æ TGGCCCACGC Noti 耳 ď AAGCTTACCA Н

TAGTCGAAAT 闰 > Н TACAGCCGTT α, ß × CGAAGACCTC SalI Н Ω 闰 CCGCGCGCC GCCTCCACGC AGGGCATCTC ß Н Ö O H Ø 4 4 ĸ Ŋ TCGCCTCCTC ß 4 71

GGGAGAGAAA 闰 Ö CTATTATCAA CCTGTGCAAC ATTCCGTCGA ບ Н CCTACGCCGA A 4 ď TCCCAAGCTG 4 ø GGCCACTATC H 141

BamHI

CGGTGGATAT TATATTGGAT GGGTCTCCGT CCAGGACCAA GACCGTGACC GGCCACKCCC CTCACTGCCG CCCAGCTGTC TGCGACATAC GACAACATCC GCCTGTACAC TCTTCCGTGG CACTGGTAGT GATACGAATC TACAACTCGA TACTAACTAC ACCCTCACGC CTTTCGACAC CAGCAAAGAA ATAATCAC XhoI H Ö æ 闰 Z H A 3 TGGATCCTCC GCGACGACAG GCAGGTTAGC CAGTATCCGG ACTACGCGCT × Ü А H А ď A ø Ø O 3 CTCAAACTGA CATTAACGGA CCTACCACAA TGCAACGGTT GTGAAGTACA Ö Z z 闰 O U GTCGAGTCGC TTGTCAAACA ρ TCGGCGCCTC CCTGGCGGCA Ö Ø ATTACAATT Q Z 351 491 421 211 281

AGCCTCGAGC CCGGTGGAGC Ø TACATGAACG ATGCCTTCCA AAACCTGCCC O ď Α CATGCCAACG ACGGCATCCC Z Σ × Α CTTCGCGTCG Ø Z 4 ď Ė H GCAATCAGGC CCGGGTCACT ď 0 Z 14 Ö CCGCGCAGCG CGCAGTATTT Ŋ ĸ O Д CTTCGGCGAA CCAGATACGA 闰 H Ö Ω Ŀ 631 561

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TTTATGATTA ATTTCTGTTG ATAAATTATC CCAGGAAAGA GTTCAAACAT CCAGGGCGGA CAGGGTGTGA ATAATGCGCA CACGACTTAT H AATATAGCGC GCAAACTAGG TTATCATATA CCCGAGTGTA GAGATGGGTT GAAGCAGATC ď Z z CTTGCGATGA GAGCTGTAAA CGTTATTAT TTTCAGCCTC > U O TAGAAAACAA TTTGGGATGA CGAGCGGAGC CTGTACATGG TGATCAGTCA ACTGAAGGAT TGTTGCCGGT TAATGCATGA Ö HindIII Ö CACTGGGGAT GAAGTGCAGT GCTGTGAGGC CCGCGTAACC GATTGAATCC AATTAACATG GAGTCCCGCA ATTATACATT TAATACGCGA C H 闰 ບ ບ AATTACGTTA AGCATGTAAT Ø GGAGAGGGG FTGGCAATAA AGTTTCTTAA Ö > ಭ 田 TGGATGTCCT

GGAGCGTTGA TCCTTACAGC GCCCAGAACA CATTTGTCTG

AGGGGTACGC CCATGGCGGT GTAGAGTACT

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GGCAACAACG TGGATGGAGG ATAAATCTGG CATCGAACTG GCCGCATACA CATGACAGTA ACAACGATCG ATCGTTGGGA TCACGTAGTG AGGAAGAGTA TTTTGCTCA AGCACTTTTA ACCCTGGCGT GGCCCGCACC GCATTAAGCG CTCCTTTCGC GCTCCCTTTA GTGGACTCTT TTTGCCGATT ATATTAACGC CTAAATACAT GIGGAGCICC AATICGCCCI CTTACTTCTG ACTCGCCTTG GGGTGATGGT TATAAGGGAT TTTTAACAAA GTTTATTTT ATATTGAAAA TGCCTTCCTG GAGTGGGTTA TCCAATGATG CAACTCGGTC TTACGGATGG CTGTAGCAAT ATTAATAGAC TTTATTGCTG TAAATCGGGG GACTGGGAAA ATAGCGAAGA CTGTAGCGGC CTAGCGCCCG TTCTTTAATA CCCGGCAACA GGCTGGCTGG ACCCCTATT TGCTTCAATA TGCGGCATTT AAGAACGTTT CGGGCAAGAG GAAAAGCATC GGATCATGTA ACCACGATGC TACTAGATCG ATAAGCTTCT AGAGCGGCCG AGCTGGCGTA AACTTGATTA GGAGTCCACG TTAACGCGAA TTGGGTGCAC CTGCGGCCAA ACAACGTCGT GGGACGCGCC TGCCAGCGCC CGTCAAGCTC TCTTTTGATT CTICIGCGCI CGGCCCTICC CGAGCGTGAC ACTCTAGCTT CCGTCGTTTT GACCCCAAAA TGTGCGCGGA CCCTGATAAA TTTCGCCCCG GTATTGACGC ACCAGTCACA AGTGATAACA ACAACATGGG CGGCTTTCCC TTCCCTTTTT TGAAGATCAG CCCTTTCGCC AATGGCGAAT CCGCTACACT CTTTGACGTT TAACAAAAT CTCGGTCTAT GCGCAGCCTG CATAACCATG GCTTTTTGC TACCAAACGA CGAACTACTT CGCAGCGTGA TTCGGGGAAA GAGACAATAA GTCGCCCTTA TAAAAGATGC CCTTGAGAGT GTATTATCCC TTGAGTACTC CGCTCACTGG CCACGTTCGC GTTTTTCGCC TCAACCCTAT TGAGCTGATT CAGCACATCC ACGGCACCTC TGCAGGACCA TCATCTATGT AATGACTTGG AATGAAGCCA TATTAACTGG CCCAACAGTT ACATTTCCGT CTGGTGAAAG GCGGTAAGAT ATGTGGCGCG GCAGTGCTGC GGAGCTAACC GTATTACGCG AATCGCCTTG GGTGGTTACG TCCTTTCTCG TTAGTGCTTT CTGATAGACG GGAACAACAC GGTTAAAAA ATCCGCTCAT GGTGGCACTT CGGATAAAGT AAGTTCTGCT CTATTCTCAG ACCGGAGCTG TTGCGCAAAC GTTCCAAACT TCAAATATGT TGAGTATTCA CCCAGAAACG GATCTCAACA AGAGAATTAT TTTCTTCCT GGGTTCCGAT GGCCATCGCC TCGGCCTATT TTACAATTTA GAGGACCGAA GCGCGCGGTG GATCGCCCTT CGGCGGGTGT ATAGTGAGTC TACCCAACTT 2661 2591 611 681 751 821 1891 1961 2031 2101 2171 2241 2311 2381 2451 2521 331 401 471 541

FIG._33C

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Wall Date of Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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CCGTATCGTA ATAGGTGCCT TAAAACTTCA TTAACGTGAG TTTTTTCTGC ATCAAGAGCT TCTAGTGTAG	TACCGGATAA CTACACCGAA GACAGGTATC GGTATCTTTA GGGGCGGAGC GCTCACATGT ATACCGCTCG	TATGCTTCC CCATGATTAC CCATGATTAC DI GAGGTCATTC AAAAGTGAAA TTTGTAAAT TTTGTAAAAT	GCAGCGATGG CTAAAGTCCT CCACCCCAGT CGCACGTCTC GTCGTGGGGG
GTAAGCCCTC GATCGCTGAG TAGATTGATT CCAAAATCCC TTGAGATCCT TGTTTGCCGG ATACTGTCCT	AGCGATAGT AGCGAACGAC GAGAAGGCG GGAAACGCCT GCTCGTCAGG CTGGCCTTTT GAGTGAGCTG	GCTTTACACT TE ACAGCTATACACT TE ACAGCTATGA CC CCCCCTC GA TE TETTGAAA TE TETTGETAGA AT AGTTCGTTGC TE ACATACT TE GACATATT TE	TGCCCCCGTT AAAACAACCC CCAACCCAAC TCCGCACCAC GTGGGTCCGG
GGGCCAGATG GAAATAGACA ATATATACTT AATCTCATGA AAGGATCTTC AGCGGTGGTT CAGATACCAA	GTTGGACTCA CCCAGCTTGG TTCCCGAAGG GCTTCCAGGG TTTTTGTGAT TGGCCTTTTG TACCGCCTTT GAAGCGGAAG	ACGACAGGIT GGCACCCCAG CACAGGAA KpnI ~~~~~~ TGGTACCGG AAAGGTACGG GATACGTCAT TCGGTTTTTA	TAAAATAGCT AACATTTACA CCAACCCAAC CCGTGAGTTG AAAACAGCAG
TGCAGCACTG ATGGATGAAC AAGTTTTACTC CCTTTTTGAT GAAAAGATCA CACCGCTACC CAGCAGAGCG	GTGCACACGG GTGCACACGG AGCGCCACGC GCACGAGGGA TGAGCGTCGA TTACGGTTCC ATAACCGTAT AGTGAGCGAG	TCACTCATTA ATAACAATTT AAAATAAAAC ATCGGTAATA TCGGTACTTT TGTATTTGAG	ATAATAAGAT TTAGACTCAA CAAGCCCAGC GGCACTATCA AAGAAAAGA
GCGGTATCAT TCAGGCAACT CTGTCAGACC AGGTGAAGAT AGACCCCGTA ACAAAAAAAC TAACTGGCTT	GATAAGTCGT CGGGGGGTTC GCTATGAGAA ACAGGAGAGC ACTCTGACT CGCGGCCTTT GATTCTGTGG GCAGCGAGTC	GTGAGTTAGC TTGTGAGTTAGC GGGATAGTCC TAAGTAAAAT GGATGTTTTG AATGCATATC	ACAATGAACA AAAGATAAAC CGATCCATAG CTCCACCCC AAAGAAAAAA GCGAGCAGCG
CGTGGGTCTC CGACGGGGAG GCATTGGTAA AAAAGGATCT ACTGAGCGTC CTGCTTGCAA TTTCCGAAGG	TGGGGCTGAA TCGGGCTGAA TACAGCGTGA CAGGGTCGGA GGGTTTCGCC ACGCCAGCAA GTTATCCCCT ACGACCGAGC	CGCAATTAAT TTGTGTGGAA CGAATTAAT CAATTAACCC GAAGAGAGTC AAAAGTTGAA GCGATTTGGA TTGTATAAGA	GGCGAATTCC TAGTAAAATA GTGCTATGCA GGCAAATAGT AAAAAAAAAG
AGCCGGTGAG GTTATCTACA CACTGATTAA TTTTCGTTCC GCGTAATCTG ACCAACTCTT	CAGTGGCTGC GGCGCAGCGG CTGAGATACC CGGTAAGCGG TAGTCCTGTC CTATGGAAAA TCTTTCCTGC CCGCAGCCGA	GCCAAGCGCAA GGCTCGTATG ATATGCTTGA ACATCAGTTA TCTACTATTA AAGTTTATTC ACAGAGGGAT	TATATATTCA GTATTTTTTC AAAGCCCAAA GCAGCCAACT GCAGCCAAAA
73 80 94 01 15 15	3291 3361 3431 3501 3571 3711	0 0 0 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	4481 45531 46621 4761 831

FIG._33D

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Fargeted 1209 070202 Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 44 of 154

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ACCACCACCA GTAACCACCC GGTAGTTTGG GGCGTCTCCG

CCCCCAACCC TACCACCACC

TCCTCCCATC CTCCTCCCC

poopoopoop ooloooolo

CTTTGGCCTT

CGGTCTCGAT

TTTTTCGTCT GGTGCGCGGG

GGACGACGAG CCCCCCCTC

TATATACATA

CCATCGCCAC

4901 4971 5041 5111

CCTCCTCCCC CGCCCCTCTC GTGGGCGAGA

CCTCGCTGCC

CTCCGTTTTT CGCCCAGATC

GCGGCTTCGT

CTCTTTCTTT

AGGGCGGGA TCTCGCGGCT

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FIG._33E

GGCGTGAGTC GGCCCGGATC CTCGCGGGGA ATGGGGCTCT CGGATGTAGA TCTTCTTTCT TTCTTTTT

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TCAGCATTGT TCATCGGTAG TTTTTCTTTT CATGATTTGT

GTAGC

GAGCTTTTTT

TTTGAATCCC

TGTGGTAGAA GCCTCGTGCG

5251 5321

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GACAAATGCA

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by fargeted Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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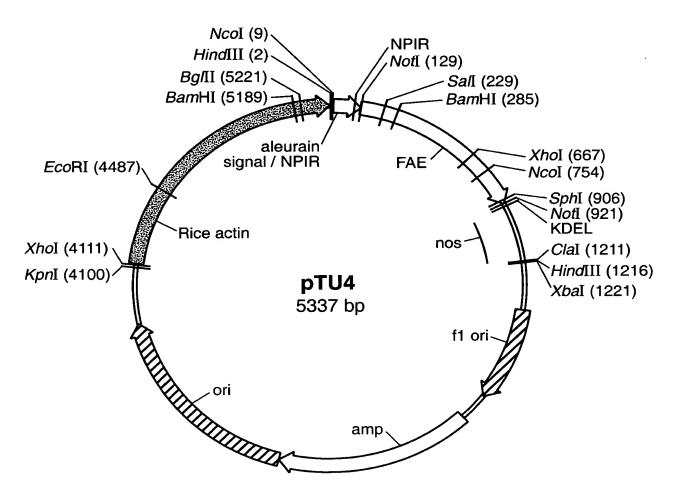


FIG._34A

ĸ Ħ NCOL HindIII

TCGCCGTGCT GGCCACGGCC GCCGTCGCCG 4 H CICCIGGCGC Н CCGCGTCCTC Н > AAGCTTACCA TGGCCCACGC 4

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TCCGAAGACC TCTACAGCCG TTTAGTCGAA ATGGCCACTA TCTCCCAAGC TGCCTACGCC GACCGCGCGG А GCCCGTCACC H > щ ACCCGATCCG Н щ Z GCCGACTCCA ß А 댐 S Ø GCAGGCCATC TCGCCTCCTC ß ß Ö 4 71 141

Z GACCTGTGCA U Н А

ACATTCCGTC GACTATTATC AAGGGAGAGA AAATTTACAA TTCTCAAACT GACATTAACG O ល Z × Ö H BamHI 211

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CCGCGACGAC AGCAGCAAAG AAATAATCAC CGTCTTCCGT GGCACTGGTA GTGATACGAA CCGCCTGTAC ACCTTCGGCG AACCGCGCAG CGGCAATCAG TCTACAACTC GATACTAACT ACACCCTCAC GCCTTTCGAC ACCCTACCAC AATGCAACGG TTGTGAAGTA CCTCGGCGCC TCCCTGGCGG CACTCACTGC CACGGTGGAT ATTATATTGG ATGGGTCTCC GTCCAGGACC AAGTCGAGTC GCTTGTCAAA CAGCAGGTT O! U ល Ü 闰 O! GCCAGTATCC GGACTACGCG CTGACCGTGA CCGGCCACKC × × G H 闰 TCTGCGACAT ACGACAACAT × ď CGCCCAGCTG GATGGATCCT O! O Ö 561 281 351 421 491

K Ē GACGCAGTAT NCOL O GCCCAGATAC А Д Ø CAAGCCTCGA ß O GCCTTCGCGT CGTACATGAA CGATGCCTTC Ēų 4 А Σ Ø 4 ᅜ 631

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CGGAGGACCG TGGGCCATCG ATTCAAATAT TATGAGTATT TAAAGTTCTG CACTATTCTC TAGAGTCCCG CCGATCGCCC TAGGGTTCCG TTGTTCCAAA TTTCGGCCTA GCTTACAATT CACCCAGAAA TGGATCTCAA TAAGAGAATT CTGGAGCGTT GATCCTTACA GCGCCCAGAA CACATTTGTC TGCACTGGGG ATGAAGTGCA GTGCTGTGAG GCATGCACCT ATTTGGCAAT TGAATTACGT TCGCGCGCGG CTATAGTGAG GTTACCCAAC **にらこうこうりこうこ** GCTTTCTTCC ບ ບ Sphi ď GGATAAATTA AAAGGAAGAG GGCATGACAG TGACAACGAT GCCCAGGGCG GACAGGGTGT GAATAATGCG CACACGACTT ATTTTGGGAT GACGAGCGGC TCGTTCAAAC TAATTTCTGT TTTTTATGAT CCAATTCGCC GAGGCCCGCA GCGCATTAAG CGCTCCTTTC GGGCTCCCTT GTTCACGTAG TAGTGGACTC ATTTTGCCGA AAATATTAAC TTCTAAATAC TGTTTTTCT TACATCGAAC TGAGCACTTT TCGCCGCATA AAACCCTGGC Q Ü ≥ ≥ ល H A GCGCAAACTA GATTATCATA TTTATAAGGG AATTTTAACA CCACTGAAGG ATGAGCTGTA AAGAAGCAGA ATGAGATGGG CGGTGGAGCT GTGACTGGGA TAATAGCGAA CCCTGTAGCG CCCTAGCGCC TCTAAATCGG TAGGGTGATG CGTTCTTTAA TTGTTTATT TAATATTGAA TTTGCCTTCC ACGAGTGGGT AGCAACTCGG TCTTACGGAT TGAGTGATAA CACTGCGGCC AACTTACTTC Σ TTTCCAATGA Ö Q Ħ Ŀ ບ × GCCGGGCAAG ATTTAACGCG CGAAGAACGT AAAACTTGAT TTTGCGGCAT AGTTGGGTGC CAGAAAAGCA CCTGTTGCCG GTCTTGCGAT TGTAATGCAT GACGTTATTT GATAGAAAC AAAATATAGC GTTACTAGAT CGATAAGCTT CTAGAGCGGC TTACAACGTC CCAGCTGGCG ATGGGACGCG CTTGCCAGCG CCCGTCAAGC TTGGAGTCCA ATTCTTTGA GAACCCCTAT AATGCTTCAA H 드 ч H 闰 耳 А HindIII TGAATGGCGA CCCTTTGACG AACCCTGATA TCACCAGTCA GGCCGTCGTT CCCCCTTTCG TCGACCCCAA ATCTCGGTCT TTTAACAAAA TATTCCCTTT CCGTATTGAC GACCGCTACA GCCGGCTTTC AATGTGCGCG GCTGAAGATC GTTTTCGCCC Z Ø × O Z ы 4 Z Д ß TAAGCATGTA ATAATTAACA GCCATAACCA ATCCTTGAGA GGCCGGTCGC GGCCGCGGAA AAAGTTTCTT AAGATTGAAT CAATTATACA TTTAATACGC TGCAGCACAT TTGCGCAGCC TTACGGCACC AATGAGCTGA TTTTCGGGGA ATGAGACAAT AGTAAAAGAT CGGTATTATC GGTTGAGTAC CGCGCAGCGT CGCCACGTTC CGGTTTTTCG ACTCAACCCT GTGTCGCCCT CGCGCTCACT > 闰 × Ö A A Д O NotI А Ö CGCTGGTGAA TGTCATCTAT TGGTTAAAA CAGCGGTAAG CTATGTGGCG AGAATGACTT ATGCAGTGCT ď TCGTATTACG TTAATCGCCT TTCCCAACAG STEGTEGTTA CTTCCTTTCT ATTTAGTGCT CCCTGATAGA CTGGAACAAC PAGGTGGCAC GTATCCGCTC CAACATTTCC > Ö Ŋ ø Д ≥ 4 1961 2031 2101 2171 2311 771 841 191 331 611 681 1751 821 1891 2241 911 981 1051 1121 1401 471 541

CGACGGCATC CCAAACCTGC CCCCGGTGGA GCAGGGGTAC GCCCATGGCG GTGTAGAGTA

CTCATGCCAA

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GGAG	ATCI	TGAT	TCGI	TAAT	AACI	TGGC	GCAG	AGAT	TAAG	TCCI	TGGA	TTCC	CAGO	CICC	AGCG	TCGI	AAGC			TGCT	TCAG	ACTA	TTT	GAGG	'ATA'		TTTI	ပညည၅
GAACCGGAGC CGTTGCGCAA GGCGGATAAA	GGAGCCGGTG TAGTTATCTA	CTCACTGATT CATTTTAAT	AGTTTTCGTT	GCGCGTAATC	CTACCAACTC AGCCGTAGTT	ACCAGTGGCT	AAGGCGCAGC	AACTGAGATA	TCCGGTAAGC	TATAGICCIG	GCCTATGGAA	GTTCTTTCCT	CGCCGCAGCC	CGCCICICCC	CAGTGAGCGC	CCGGCTCGTA	ACGCCAAGCG			TCATATGCTT	AAACATCAGT	TTTCTACTAT	TTAAGTTTAT	ATACAGAGGG	AATATATT		GGGTATTTT	CTAAAGCCCA
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TGATCGTTGG ATGGCAACAA ACTGGATGGA	TGATAAATCT TCCCGTATCG	AGATAGGTGC TTTAAAACTT	CCTTAACGTG	CTTTTTTCT	GGATCAAGAG CTTCTAGTGT	TAATCCTGTT	GTTACCGGAI	ACCTACACCG	CGGACAGGTA	CTGGTATCTT	GGGGGGCGGA	TTGCTCACAT	TGATACCGCT	ATACGCAAAC	GGAAAGCGGG	CTTTATGCTT	GACCATGATT		ı	TCGAGGTCAT	TCAAAAGTGA	AATTTACTCT	GAATTGGTTT	GCTTTTGTAA	ttttgagaaa		TTGCAGCGAT	CCCTAAAGTC
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TAACTCGCCT GCCTGTAGCA CAATTAATAG	GGTTTATTGC TGGTAAGCCC	CAGATCGCTG TTTAGATTGA	AATC	GATC	TTTGTTTGCC AAATACTGTC	CIGC	CAAGACGATA	GGAGCGAACG	GGGAGAAAGG	GGGGAAACGC	ATGCTCGTCA	CCLT	TTGAGTGAGC	AGAGCGCCCA	TITCCCGACT	AGGCTTTACA	CTAT		ı	ວວວວວວວອອ	GATTACCTGG	CCCAAAGTGA	GTAT	TAAGTTCGTT	TAAT		CTTGCCCCCG	CAAAAACAAC
ACTC	GGTTTATTGC TGGTAAGCCC	IGATC	GACCAAAATC	TCTTGAGATC	TTGTT	CTCGCTCTGC	AGAC	AGCG	GAGA	GGAA	GCTC	TGCTGGCCTT	rgagi	BAGCG	TCCC	GCTI	AAACAGCTAT			36000	ATTAC	CAAA	ATTTTTGTAT	AGTT	TTGACATAAT		rrgcc	AAAA
			_		•	_	_	_	Ξ.	_	•	_	-		_		•		2 2	_	Ξ.	-		_	E		_	_
ACGA	CCAG	LATAG LTATA	CTC	GATC	GGTC:	CATA	GGAC	AGCI	(B)		TTTGI	CCTT	CGCC	NGCGG	ACAG	ACCC	ACAC	KpnI		GTAC	GGTA	GGTG	PACGI	GTTJ	CTA		AATZ	ATT
GGGGATCATG ACACCACGAT TTCCCGGCAA	CCGGCTGGCT TGGGGCCAGA	ACGAAATAGA TCATATATAC	ATAATCTCAT	CAAAGGATCT	CCAGCGGTGG CGCAGATACC	GCCTACATAC	GGGTTGGACT	AGCCCAGCTT	GCTTCCCGAA	GAGCTTCCAG	GATTTTTGTG	CCTGGCCTTT	ATTACCGCCT	AGGAAGCGGA	GCACGACAGG	TAGGCACCCC	TTCACACAGG		•	GCTGGGTACC	ACAAAGGTAA	TAAAAGGTGG	TTGATACGTC	AGTCGGTTTT	ATATGCTAA		ATTAAAATAG	AAAACATTTA
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GCACAACATG GACGAGCGTG TTACTCTAGC	CTCGGCCCTT	CTATGGATGA CCAAGTTTAC	ATCCTTTTTG	TAGAAAAGAT	ACCACCGCTA TTCAGCAGAG	CTGTAGCACC	GTGTCTTACC	TCGTGCACAC	AAAGCGCCAC	GCGCACGAGG	CTTGAGCGTC	TTTTACGGTT	GGATAACCGT	TCAGTGAGCG	AATGCAGCTG	GCTCACTCAT	GGATAACAAT			GGGAACAAAA	CCAAAATAAA	ATATCGGTAA	TGTCGGTACT	TCTGTATTTG	TAAAAACCC		CAATAATAAG	ACTTAGACTC
GAC	ATT	C TA	ATC	_	-	_	GTG	TCG	A A	<u>က</u>	CHI	TII	GGA	TCA	AAT	GCT	GGA			_	SCA	ATA	TGT	TCT	TAA		CAA	ACT
GCTTTTTT TACCAAAC CGAACTAC	CTTCTGCG GCGGTATC	TCAGGCAA CTGTCAGA	GAAG	5000	AAAA TGGC	AACT	AGTC	CGGGGGGT	GCTATGAG	GAGA	CTGA	ECCI	CTGT	CGAG	CATT	GTGAGTTA	TIGIGAGC			TCACTAAA	TAGT	TAAA	GTTT	AATGCATA	AATATCTT		ACAATGAA	AAAGATAA
			AGGTGAAG	AGACCCCG	AAACAAAAAA GGTAACTGGC	CAAGAACT				ACAGGAGA	ACCTCTGA	こののののでは	GATTCTGT	GCAGCGAG		GTGA					GGGATAGT	TAAGTAAA	GGATGTTT	AATG				AAAG
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AAGGAGCTAA TGAATGAAGC ACTATTAACT	GTTGCAGGAC AGCGTGGGTC	CACGACGGGG AAGCATTGGT	TTAAAAGGAT	CCACTGAGCG	TGCTGCTTGC TTTTTCCGAA	AGGCCACCAC	GCTGCCAGTG	GGTCGGGCTG	CCTACAGCGT	GGCAGGGTCG	TCGGGTTTCG	AAACGCCAGC	GCGTTATCCC	GAACGACCGA	CGCGCGTTGG	AACGCAATTA	GTTG			CGCAATTAAC	GAGAAGAGAG	TAAAAGGTGG	TATAAAATT	TCGCGATTTG	ATTTGTATAA ECORI		CAGGCGAATT	TCTAGTAAAA
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FIG._34D

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Fargeted Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 49 of 154

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46214691	4621 AAGTGCTATG CA 4691 CTGGCAAATA GT	0 6 4	AGCAAGCCCA CCGGCACTAT	ACGATCCAT AGCAAGCCCA GCCCAACCCA ACCCAACCCA	ACCCAACCCA TGTCCGCACC	ACCCACCCCA ACCGCACGTC	GTGCAGCCAA TCGCAGCCAA
4831	GCGAGGAGGA	TCGCGAGCAG	CGACGAGGCC	TCGCGAGCAG CGACGAGGCC CGGCCCTCCC TCCGCTTCCA AAGAAACGCC CCCCATCGCC	TCCGCTTCCA	AAGAAACGCC	CCCCATCGCC
4901	ACTATATACA	TACCCCCCC	TCTCCTCCCA	TACCCCCCC TCTCCTCCCA TCCCCCCAAC CCTACCACCA CCACCACCAC CACCTCCTCC	CCTACCACCA	CCACCACCAC	CACCTCCTCC
4971	CCCCTCGCTG	CCCCTCGCTG CCGGACGACG AGCTCCTCCC CCCTCCCCT CCGCCGCCGC CGGTAACCAC CCCGCCCTC	AGCTCCTCCC	CCCTCCCCCT	ეხეეხეეხეე	CGGTAACCAC	೧೭೦೦೦೦೦೩೦
5041	TCCTCTTTCT	TICTCCGTIT TITITICGT CICGGICICG AICTITGGCC TIGGIAGITT GGGIGGCCGA	TTTTTTCGT	CTCGGTCTCG	ATCTTTGGCC	TTGGTAGTTT	GGGTGGCCGA
5111	GAGCGGCTTC	GAGCGGCTTC GTCGCCCAGA TCGGTGCGCG GGAGGGGCGG GATCTCGCGG CTGGCGTCTC CGGGCGTGAG	TCGGTGCGCG	GGAGGGGCGG	GATCTCGCGG	CTGGCGTCTC	CGGGCGTGAG
	BamHI	H		Bg	Bglii		
	111111111111111111111111111111111111111	1111		•	111111111111111111111111111111111111111		
5181	TCGGCCCGGA	TCGCCCCGGA TCCTCGCGGG GAATGGGGCT CTCGGATGTA GATCTTCTTT CTTTCTTT TTTGTGGTAG	GAATGGGGCT	CTCGGATGTA	GATCTTCTTT	CTTTCTTCTT	TTTGTGGTAG
5251	AATTTGAATC	AATITGAAIC CCICAGCAIT GIICAICGGI AGIITITICII IICAIGAIII GIGACAAAIG CAGCCICGIG	GTTCATCGGT	AGTTTTTCTT	TTCATGATTT	GTGACAAATG	CAGCCTCGTG
5321	CGGAGCTTTT TTGTAGC	TTGTAGC					

FIG._34E

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Fargeted Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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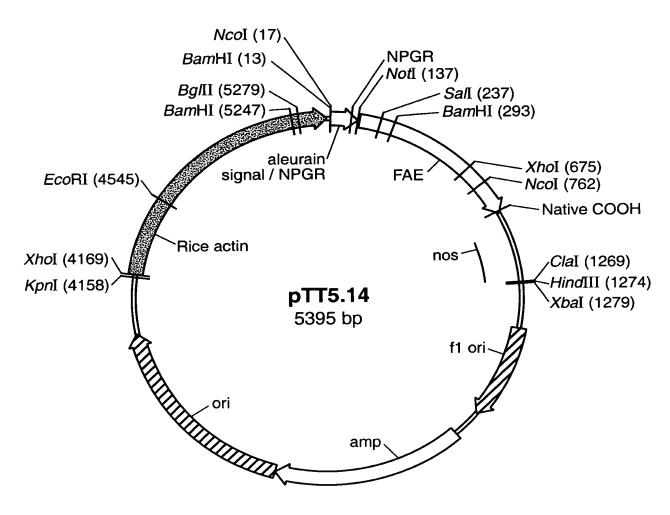


FIG._35A

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted Expression of Genes Encoding Cell Wall..." SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 51 of 154

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CCTGACGCCG AGGATCCATG GCCCACGCCC GCGTCCTCCT CCTGGCGCTC GCCGTGCTGG CCACGGCCGC 4 H Þ > 4 Н

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CGTCGCCGTC GCCTCCTCCT CCTCCTTCGC CGACTCCAAC CCGGGCCGGC CCGTCACCGA CCGCGGGCC A H > ρι œ U Д Z യ Д 4 ſщ Ø Ø Ø ល ď. > **A** > . 71

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А CCTACGCCGA CCTGTGCAAC ATTCCGTCGA CTATTATCAA GGGAGAGAAA ATTTACAATT CTCAAACTGA H O Ø Z × Н ¥ 臼 G ĸ Н н 222222 H SalI Ø Д Z ບ BamHI Ы А 4 × 211

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GTGAAGTACA CGGTGGATAT TATATTGGAT GGGTCTCCGT CCAGGACCAA GTCGAGTCGC TTGTCAAACA GATACGAATC TACAACTCGA TACTAACTAC ACCCTCACGC CTTTCGACAC CCTACCACAA TGCAACGGTT GCAGGTTAGC CAGTATCCGG ACTACGCGCT GACCGTGACC GGCCACKCCC TCGGCGCCTC CCTGGCGGCA CATTAACGGA TGGATCCTCC GCGACGACAG CAGCAAGAA ATAATCACCG TCTTCCGTGG CACTGGTAGT ĸ r I O e E > Ы O S S g B ĸ Ö Н > F D T O X H D K L Α Н O Д œ N S V H 闰 H NO > × 1 ល H 3 ល ¥ N Ü X X А H * А H K А ĸ ß Н <u>۲</u> ن Д Ц Ы × н O O ט O × н ď I Ø Ö Z 4 > > Z H H н 281 351 421 491

TACATGAACG ATGCCTTCCA AGCCTCGAGC CCAGATACGA CGCAGTATTT NCOL O H H A д ຜ ໝ 4 O Ŀ ď А Z Σ × CTTCGCGTCG Ŋ 4 庙 GCAATCAGGC 4 Ø Z 631

CTCACTGCCG CCCAGCTGTC TGCGACATAC GACAACATCC GCCTGTACAC CTTCGGCGAA CCGCGCAGCG

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AATCGCCTTG CACTGGGGAT GAAGTGCAGT TGGATGTCCT GGAGAGGGGG AATTACGTTA AGCATGTAAT GAGTCCCGCA ATTATACATT GTATTACGCG CCCAACAGTT GGTGGTTACG TCCTTTCTCG CTGATAGACG GGAACAACAC GGTTAAAAA CTGGTGAAAG ATGTGGCGCG AATGACTTGG GCAGTGCTGC GGAGCTAACC GCTGTGAGGC CCAGGGCGGA CAGGGTGTGA ATAATGCGCA CACGACTTAT TTTGGGATGA CGAGCGGAGC TIGGCAATAA AGTITCTIAA GCGCGCGTG TCATCTATGT TTAGTGCTTT GGTGGCACTT ATCCGCTCAT ACATTTCCGT GCGGTAAGAT G H CTATTCTCAG AAGTTCTGCT TACTAGATCG ATAAGCTTCT AGAGCGCCG GTGGAGCTCC AATTCGCCCT ATAGTGAGTC TACCCAACTT GATCGCCCTT CGGCGGGTGT TTTCTTCCT GGGTTCCGAT GGCCATCGCC GTTCCAAACT TCGGCCTATT TTACAATTTA TCAAATATGT TGAGTATTCA CCCAGAAACG GATCTCAACA AGAGAATTAT GAGGACCGAA r E TCCTTACAGC GCCCAGAACA CATTTGTCTG ACCCTGGCGT ATTTCTGTTG AATATAGGGC GCAAACTAGG ATAAATTATC AGCACTTTTA CATGACAGTA ACAACGATCG CCAGGAAAGA GTTCAAACAT TTTATGATTA GGCCCGCACC GCATTAAGCG CTCCTTTCGC GCTCCCTTTA TCACGTAGTG TTTGCCGATT ATATTAACGC CTAAATACAT AGGAAGAGTA TTTTGCTCA CATCGAACTG GCCGCATACA GTGGACTCTT F F CTTACTTCTG CCCGAGTGTA TTATCATATA GAGATGGGTT GACTGGGAAA TAAATCGGGG GGGTGATGGT TTTTAACAAA TGCCTTCCTG TCCAATGATG CTGTAGCGGC CTAGCGCCCG TTCTTTAATA TATAAGGGAT GTTTATTTT ATATTGAAAA GAGTGGGTTA CAACTCGGTC TTACGGATGG NAN GAAGCAGATC ATAGCGAAGA N > TTTCAGCCTC AGCTGGCGTA TGCTTCAATA CTGCGGCCAA CTTGCGATGA CGTTATTTAT ACAACGTCGT GGGACGCGCC CGTCAAGCTC TCTTTTGATT TGCGGCATTT GAGCTGTAAA TGCCAGCGCC AACTTGATTA GGAGTCCACG TTAACGCGAA ACCCCTATT TTGGGTGCAC AAGAACGTTT CGGGCAAGAG GAAAAGCATC O GTAGAGTACT GGAGCGTTGA TAATACGCGA TAGAAACAA CCGTCGTTTT CCCTTTCGCC AATGGCGAAT TTTCGCCCCG ACCAGTCACA AGTGATAACA TGATCAGTCA TGTTGCCGGT TAATGCATGA CCGCTACACT GACCCCAAAA TAACAAAAT TGTGCGCGGA GTATTGACGC CCGCGTAACC ACTGAAGGAT CGGCTTTCCC CTTTGACGTT CTCGGTCTAT CCCTGATAAA TTCCCTTTTT TGAAGATCAG <u>ი</u> HindIII 0 CTGTACATGG CGCTCACTGG SCGCAGCCTG CATAACCATG GATTGAATCC AATTAACATG CAGCACATCC CGCAGCGTGA CACGTTCGC PTCGGGGAAA GTCGCCCTTA CCTTGAGAGT TTGAGTACTC ACGGCACCTC GTTTTTCGCC TCAACCCTAT **IGAGCTGATT** SAGACAATAA PAAAGATGC STATTATCCC CE C 771 .751 1821 1891 2031 2381 2451 841 981 331 541 611 .681 1961 2101 2171 2241 2311 911 1051 1121 1191 1401 471

CCGGGTCACT CATGCCAACG ACGGCATCCC AAACCTGCCC CCGGTGGAGC AGGGGTACGC CCATGGCGGT

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FIG._35C

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GGATCATGTA ACTCGCCTTG

ACAACATGGG CGAGCGTGAC

GCTTTTTGC

2521 2591 2661

CTGTAGCAAT

ACCACGATGC

CCCGCCAACA ATTAATAGAC

ACTCTAGCTT

CGAACTACTT

TGCAGGACCA

CGGATAAAGT

TTGCGCAAAC

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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CGTGGGTCTC CGACGGGGAG GCATTGGTAA AAAAGGATCT ACTGAGCGTC	TTTCCGAAGG GCCACCACTT TGCCAGTGGC TCGGGCTGAA TACAGCGTGGA CAGGGTCGGA GGGTTTCGCC ACGCCAGCAA	GTTATCCCCT ACGACCGAGC CGCGTTGGCC CGCATTAAT TTGTGTGGAA CAATTAACC AAAGGTGGTA TAAAAATTGA GCGATTTGGA TTGTATAAGA	GGCGAATTCC TAGTAAAATA GTGCTATGCA GGCAAATAGT AAAAAAAAG
AGCCGGTGAG GTTATCTACA CACTGATTAA TTTTTAATTT TTTTCGTTCC	ACCAACTCTT CCGTAGTTAG CAGTGGCTGC GGCGCAGCGG CTGAGATACC CGGTAAGCGG TAGTCCTGTC CTATGGAAAA	CCGCAGCGA CCTCTCCCG GTGAGCGCAA GGCTCGTATG GCCAAGCGCG ACATCAGTTA ACATCAGTTA AAGTTTATTC ACAGAGGGAT	TATATATTCA GTATTTTTTC AAAGCCCAAA GCAGCCAACT GCAGCCAAAA
ATAAATCTGG CCGTATCGTA ATAGGTGCCT TAAAACTTCA TTAACGTGAG	ATCAAGAGCT TCTAGTGTAG ATCCTGTTAC TACCGGATAA CTACACCGAA GACAGGTATC GGTATCTTTA GGGGCGGAGC	ATACCGCTCG AAAGCGGGCA TTATGCTTCC CCATGATTAC CAAAGTGAAA TTTACTCTTT ATTGTAAAT TTTTGTAAAT	TTGAGAAAAA GCAGCGATGG CTAAAGTCCT CCACCCCAGT CGCACGTCTC
TTTATTGCTG GTAAGCCCTC GATCGCTGAG TAGATTGATT CCAAAATCCC TTGAGATCCT	TGTTTGCCGG ATACTGTCCT CGCTCTGCTA AGACGATAGT AGCGAACGAC GAGAAAGGCG GGAAACGCCT GCTCGTCAGG	GAGTGAGCTG A GAGTGAGCTG A TCCCGACTGG A GCTTTACACT T ACAGCTATGA C TTACCTC G TTACCTGGTC A CAAAGTGAAA T TTTTGTATGA A AGTTCGTTGC T	GACATAATTT TGCCCCCGTT AAAACAACCC CCAACCCAAC
GGCCAGGCTGG GGGCCAGATG GAAATAGACA ATATATACTT AATCTCATGA	AGCGGTGGTT CAGATACCAA CTACATACCT GTTGGACTCA CCCAGCTTGG TTCCCGAAGG GCTTCCAGGG	TACCGCCTTT GAAGCGCAAG ACGACCCCAG CACACCCCAG KpnI XpnI TGGTACCGG AAAGGTAAGA AAAGGTACCGG	ATGCTAATTT TAAAATAGCT AACATTTACA CCAACCCAAC
CGGCCCTTCC TGCAGCACTG ATGGATGAAC AAGTTTACTC CCTTTTTGAT GAAAGATCA	CACCGCTACC CAGCAGAGCG GTAGCACCGC GTCTTACCGG GTGCACACAC AGCGCACGC AGCGCCACGC TGAGCGTCGA	ATAACCGTAT AGTGAGCGAG TGCAGCTGGC TCACTCATTA ATAACAATTT AAAATAAAAC ATCGGTAATA TGGGTACTTT	AAAAACCCAT ATAATAAGAT TTAGACTCAA CAAGCCCAGC GGCACTATCA AAGAAAAAGA
CTTCTGCGCT GCGGTATCAT TCAGGCAACT CTGTCAGACC AGGTGAAGAT AGACCCGGTA	ACAAAAAAAC TAACTGGCTT CAAGAACTCT GATAAGTCGT CGGGGGGTTC GCTATGAGAA ACAGGAGAGC ACCTCTGACT	GATTCTGTGG GCAGCGAGTC GATTCATTAA GTGAGTTAGC TTGTGAGCGG GGGATGTTTTG AATGCATATC	AATATCTTTA ACAATGAACA AAAGATAAAC CGATCCATAG CTCCACCCC
273 80 80 10 10 10	3151 3221 3221 3431 3501 3571	-	4481 4551 4621 4691 4761

FIG._35D

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Fargeted Plant Cell Walls by Fargeted Plant Cell Walls..."

Expression of Genes Encoding Cell Wall..."

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TATATACATA CCTCGCTGCC GCGGCTTCGT CGCCCAGATC GGTGCGCGGG AGGGGCGGGA TCTCGCGGCT GGCGTCTCCG GGCGTGAGTC GGCCCGGATC TGTGGTAGAA TTTGAATCCC TCAGCATTGT TCATCGGTAG TTTTTCTTTT CATGATTTGT GACAAATGCA GCCTCGTGCG GAGCTTTTTT CTCTTTCTTT GAAACGCCCC CCATCGCCAC GGTAGTTTGG GTGGCCGAGA CGCCCCTCTC CCTCCTCCCC ACCACCACCA TTCTTCTTT GTAACCACCC TACCACCACC CGGTCTCGAT CTTTGGCCTT CGGATGTAGA TCTTCTTTCT **9009009009** CGCTTCCAAA 2222222 CCCCCAACCC CTCCCCCTCC GCCCTCCCTC TTTTCGTCT CTCGCGGGGA ATGGGGCTCT ACGAGGCCCG CCCCCCCTC TCCTCCCATC CTCCTCCCCC GCGAGCAGCG CTCCGTTTTT GGACGACGAG BamHI 5181 4971 5041 5111 5251 5321 5391

FIG._35E

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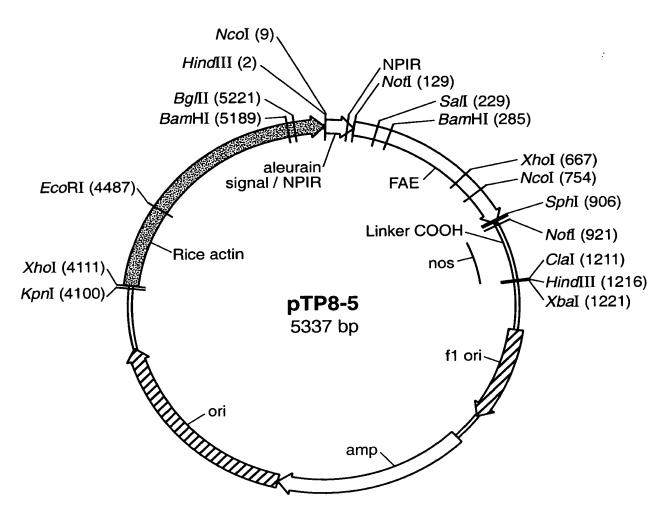


FIG._36A

NCOL

HindIII

CTCCTGGCGC TCGCCGTGCT GGCCACGGCC GCCGTC NotI 4 H 4 Н CCGCGTCCTC > AAGCTTACCA TGGCCCACGC 4

Ø 1111111 ø A H > 军 ρι

TGCCTACGCC TCTCCCAAGC GACCGCGCGG ATGGCCACTA GCCCGTCACC TTTAGTCGAA ACCCGATCCG Z TCCGAAGACC TCTACAGCCG GCCGACTCCA ß А 4 SalI CTCCTCCTTC А ß 闰 ໝ GCAGGCCATC TCGCCTCCTC ß ß 4 141

GACATTAACG TTCTCAAACT O Ø AAGGGAGAGA AAATTTACAA Z ĸ 闰 Ö × GACTATTATC H GACCTGTGCA ACATTCCGTC Z U Н 211

BamHI

GTGATACGAA S GGCACTGGTA O CCGCGACGAC AGCAGCAAAG AAATAATCAC CGTCTTCCGT 闰 × ໝ ß Z GATGGATCCT 281

TTGTGAAGTA CAGCAGGTT GCCTTTCGAC ACCCTACCAC AATGCAACGG GCTTGTCAAA CACGGTGGAT ATTATATTGG ATGGGTCTCC GTCCAGGACC AAGTCGAGTC U O Н TCTACAACTC GATACTAACT ACACCCTCAC Ö Ö 351 421

CCTCGGCGCC TCCCTGGCGG CACTCACTGC CCGCCTGTAC ACCTTCGGCG AACCGCGCAG CGGCAATCAG 闰 GCCAGTATCC GGACTACGCG CTGACCGTGA CCGGCCACKC TCTGCGACAT ACGACAACAT H CGCCCAGCTG 491 561

GACGCAGTAT NCOL O GCCCAGATAC А Д Ø CAAGCCTCGA Ø 4 O GCCTTCGCGT CGTACATGAA CGATGCCTTC ď А Z Σ S 4 بعا 631

闰 Ç Ö H ď × Ö O 国 > Д Д Н Z Д Н Ü A Z ď 出

TGAATTACGT TAGAGTCCCG TCGCGCGCGG

GCGCAAACTA GGATAAATTA

TTTTTATGAT

TAATTTCTGT

GATTATCATA ATGAGATGGG

TGTAATGCAT GACGTTATTT GATAGAAAC AAAATATAGC

CCTGTTGCCG GTCTTGCGAT

A Q G G Q G V N N A H T T Y F G M T S G A C T C GCCCAGGGCG GACAGGGTGT GAATAATGCG CACACGACTT ATTTTGGGAT GACGAGCGGC GCATGCACCT ATTTGGCAAT CTGGAGCGTT GATCCTTACA GCGCCCAGAA CACATTTGTC TGCACTGGGG ATGAAGTGCA GTGCTGTGAG ບ Sphī ບ TCGTTCAAAC O **⊳** A GGCCGGTCGC GGCCGCGTAA CCACTGAAGG ATGAGCTGTA AAGAAGCAGA Ō H ບ E E Ø 841 771

CTCATGCCAA CGACGGCATC CCAAACCTGC CCCCGGTGGA GCAGGGGTAC GCCCATGGCG GTGTAGAGTA

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ClaI XbaI

Hindill

CAATTATACA TTTAATACGC

1121

AAAGTTTCTT AAGATTGAAT

981 1051

TAAGCATGTA ATAATTAACA

TAGGGTTCCG GCTTACAATT TAAGAGAATT TGGGCCATCG TTTCGGCCTA ATTCAAATAT TATGAGTATT CACCCAGAAA TAAAGTTCTG CACTATTCTC GTTACCCAAC CCGATCGCCC CGCGGCGGGT TGGATCTCAA CTATAGTGAG GCTTTCTTCC TTGTTCCAAA GGCATGACAG AAAGGAAGAG TGAGCACTTT TCGCCGCATA GTTCACGTAG TAGTGGACTC ATTTTGCCGA AAATATTAAC TTCTAAATAC TGTTTTTGCT TACATCGAAC CCAATTCGCC GCGCATTAAG CGCTCCTTTC GGGCTCCCTT AAACCCTGGC GAGGCCCGCA GTGACTGGGA TTTATAAGGG TCTTACGGAT CGGTGGAGCT TAATAGCGAA TCTAAATCGG TAGGGTGATG AATTTTAACA TTGTTTTTT TAATATTGAA TTTGCCTTCC ACGAGTGGGT TTTCCAATGA AGCAACTCGG CCCTGTAGCG CCCTAGCGCC CGTTCTTTAA TCACCAGTCA CAGAAAAGCA AGTTGGGTGC GCCGGGCAAG ATTTAACGCG AATGCTTCAA TTTGCGGCAT CGAAGAACGT CTTGCCAGCG AAAACTTGAT TTGGAGTCCA ATTCTTTGA GAACCCCTAT GTTACTAGAT CGATAAGCTT CTAGAGCGGC TTACAACGTC CCAGCTGGCG ATGGGACGCG CCCGTCAAGC AACCCTGATA GCTGAAGATC ATCTCGGTCT GGCCGTCGTT TGAATGGCGA TCGACCCCAA CCCTTTGACG TTTAACAAAA AATGTGCGCG TATTCCCTTT GTTTTCGCCC CCGTATTGAC CCCCCTTTCG GACCGCTACA GCCGGCTTTC GGTTGAGTAC TTTTCGGGGA ATGAGACAAT AGTAAAAGAT ATCCTTGAGA CGGTATTATC TGCAGCACAT CGGTTTTTCG ACTCAACCCT AATGAGCTGA GTGTCGCCCT CGCGCTCACT CGCGCAGCGT TTACGGCACC TTGCGCAGCC CGCCACGTTC CGCTGGTGAA CAGCGGTAAG AGAATGACTT TTGGTTAAAA GTATCCGCTC CTATGTGGCG **FAGGTGGCAC** TGTCATCTAT ATTTAGTGCT CTGGAACAAC CAACATTTCC GTGGTGGTTA CTTCCTTTCT CCCTGATAGA **ICGTATTACG** PTAATCGCCT TTCCCAACAG 1961 2031 2101 1331 541 681 751 821 891 2171 2241 1261 1401 471 611

FIG._36C

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted Expression of Genes Encoding Cell Wall..."

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. Ε 4 Ι	ATGCAGTGCT	GCCATAACCA	TGAGTGATAA	CACTGCGGCC GGGGATCATG	AACTTACTTC	TGACAACGAT	CGGAGGACCG
2521 2591	TGAATGAAGC ACTATTAACT	CATACCAAAC GGCGAACTAC	GACGAGCGTG TTACTCTAGC	ACACCACGAT TTCCCGGCAA	GCCTGTAGCA	ATGGCAACAA ACTGGATGGA	CGTTGCGCAA GGCGGATAAA
99	GTTGCAGGAC	CACTTCTGCG	CTCGGCCCTT	CCGGCTGGCT	GGTTTATTGC	TGATAAATCT	GGAGCCGGTG
73	AGCGTGGGTC	TCGCGGTATC	ATTGCAGCAC	TGGGGCCAGA	TGGTAAGCCC	TCCCGTATCG	TAGTTATCTA
80	CACGACGGGG	AGTCAGGCAA	CTATGGATGA	ACGAAATAGA	CAGATCGCTG	AGATAGGTGC	CTCACTGATT
87	AAGCATTGGT	AACTGTCAGA	CCAAGTTTAC	TCATATAC	TTTAGATTGA	TTTAAAACTT	CATTTTAAT
9	TTAAAAGGAT	CTAGGTGAAG	ATCCTTTTTG	ATAATCTCAT	GACCAAAATC	CCTTAACGTG	AGTTTTCGTT
2	CCACTGAGCG	TCAGACCCCG	TAGAAAAGAT	CAAAGGATCT	TCTTGAGATC	CITITITICI	GCGCGTAATC
80	TGCTGCTTGC	AAACAAAAA	ACCACCGCTA	CCAGCGGTGG	TTTGTTTGCC	GGATCAAGAG	CTACCAACTC
15	TTTTTCCGAA	GGTAACTGGC	TTCAGCAGAG	CGCAGATACC	AAATACTGTC	CTTCTAGTGT	AGCCGTAGTT
22	AGGCCACCAC	TTCAAGAACT	CTGTAGCACC	GCCTACATAC	CICGCICIGC	TAATCCTGTT	ACCAGTGGCT
3291	GCTGCCAGTG	GCGATAAGTC	GTGTCTTACC	GGGTTGGACT	CAAGACGATA	GTTACCGGAT	AAGGCGCAGC
36	GGTCGGGCTG	AACGGGGGGT	TCGTGCACAC	AGCCCAGCTT	GGAGCGAACG	ACCTACACCG	AACTGAGATA
43	CCTACAGCGT	GAGCTATGAG	AAAGCGCCAC	GCTTCCCGAA	GGGAGAAAGG	CGGACAGGTA	TCCGGTAAGC
50	GGCAGGGTCG	GAACAGGAGA	GCGCACGAGG	GAGCTTCCAG	GGGGAAACGC	CTGGTATCTT	TATAGTCCTG
57	TCGGGTTTCG	CCACCTCTGA	CTTGAGCGTC	GATTTTTGTG	ATGCTCGTCA	GGGGGGCGGA	GCCTATGGAA
64	AAACGCCAGC	AACGCGGCCT	TTTTACGGTT	CCTGGCCTTT	TGCTGGCCTT	TIGCICACAI	GTTCTTTCCT
71	GCGTTATCCC	CTGATTCTGT	GGATAACCGT	ATTACCGCCT	TTGAGTGAGC	TGATACCGCT	CGCCGCAGCC
78	GAACGACCGA	GCGCAGCGAG	TCAGTGAGCG	AGGAAGCGGA	AGAGCGCCCA	ATACGCAAAC	CGCCICICCC
3851	CGCGCGTTGG	CCGATTCATT	AATGCAGCTG	GCACGACAGG	TTTCCCGACT	GGAAAGCGGG	CAGTGAGCGC
92	AACGCAATTA	ATGTGAGTTA	GCTCACTCAT	TAGGCACCCC	AGGCTTTACA	CTTTAIGCTI	CCGGCTCGTA
9	TGTTGTGTGG	AATTGTGAGC	GGATAACAAT	TTCACACAGG	AAACAGCTAT	GACCATGATT	ACGCCAAGCG
				KpnI	~	XhoI	
				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	•	1111	
90	CGCAATTAAC	CCTCACTAAA	GGGAACAAAA	GCTGGGTACC	ವವವವವವಾ <u>ರ</u>	TCGAGGTCAT	TCATATGCTT
m	GAGAAGAGAG	TCGGGATAGT	CCAAAATAAA	ACAAAGGTAA	GATTACCTGG	TCAAAAGTGA	AAACATCAGT
20	TAAAAGGTGG	TATAAGTAAA	ATATCGGTAA	TAAAAGGTGG	CCCAAAGTGA	AATTTACTCT	TTTCTACTAT
4271	TATAAAAATT	GAGGATGTTT	TGTCGGTACT	TTGATACGTC	ATTTTTGTAT	GAATTGGTTT	TTAAGTTTAT
잭	TCGCGATTTG	GAAATGCATA	TCTGTATTTG	AGTCGGTTTT	TAAGTTCGTT	GCTTTTGTAA	ATACAGAGGG
41	ATTTGTATAA	GAAATATCTT	TAAAAAACCC	ATATGCTAAT	TTGACATAAT	TTTTGAGAAA	AATATATT
	Ü						
	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	5 (
4481	CAGGCGAATT	CCACAATGAA	CAATAATAAG	ATTAAAATAG	CTTGCCCCCG	TTGCAGCGAT	GGGTATTTT

-1G._36D

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Wallshy Targeted Expression of Genes Encoding Cell Wall..."

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CCCGCCCTC CGGGCGTGAG TTTGTGGTAG CAGCCTCGTG CCCCATCGCC CACCTCCTCC GGGTGGGCGA TCGCAGCCAA CTAAAGCCCA GTGCAGCCAA GGCCGGAAAA TCGGCCCGGA TCCTCGCGGG GAATGGGGCT CTCGGATGTA GATCTTCTTT CTTTCTTCTT GTGACAAATG CGGTAACCAC TTGGTAGTTT CTGGCGTCTC CCCTAAAGTC ACCGCACGTC GGGTCGTGGG AAGAAACGCC CCACCACCAC ACCCACCCCA TCCGCTTCCA CCTACCACCA GGAGGGCGG GATCTCGCGG CCTCAGCATT GTTCATCGGT AGTTTTTCTT TTCATGATTT ACCCAACCCA TGTCCGCACC ၁၅၁၁၅၁၁၅၁၁ CTCGGTCTCG ATCTTTGGCC CAAAAACAAC AGGTGGGTCC CCCTCCCCT GCCCAACCCA CGGCCCTCCC AAAACATTTA CACCGTGAGT GAAAAACAGC TCCCCCCAAC TCTCCTCCCA TTTTTTCGT TCGGTGCGCG AAAAGAAAAA AGCTCCTCCC ACTTAGACTC AGCAAGCCCA CCGGCACTAT CGACGAGGCC CCGGACGACG TAAAAGATAA AGAAGAAAA TTCTCCGTTT GAGCGGCTTC GTCGCCCAGA CACGATCCAT TCGCGAGCAG TACCCCCCC GTCTCCACCC TTGTAGC 222222 BamHI TCCTCTTTCT CGGAGCTTTT ACTATATACA CCCTCGCTG AATTTGAATC AAAAAAAA GCGAGGAGGA TCTAGTAAAA AAGTGCTATG CTGGCAAATA 5181 5251 5321 4621 4971 4691 1831 4901 5041 4761

FIG._36E

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls Targeted Expression of Genes Encoding Cell Wall..."

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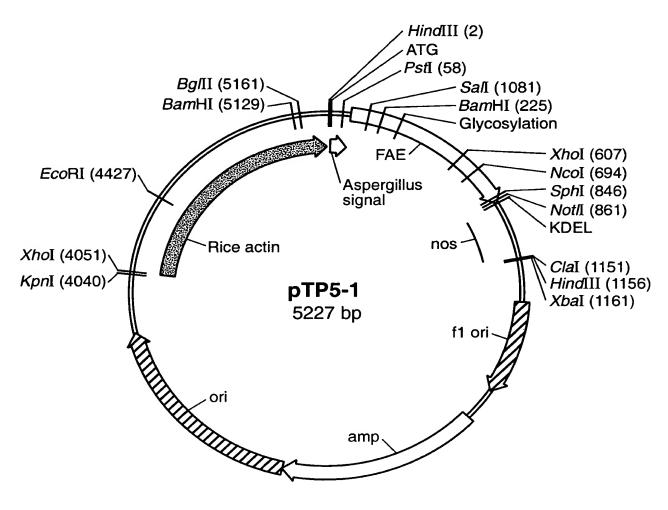


FIG._37A

GACTGCAGGG CACGCCTTAG 222222 PstI Ø CTCCGCCAAA CACGTCCTCG CAGTTGTGGT ы > × Ы Ω 4 闰 AAGCTTAACA TGAAGCAGTT H O HindIII 22222

CAGCCTCTAC GCAAGGCATC TCCGAAGACC TCTACAGCCG TTTAGTCGAA ATGGCCACTA TCTCCCAAGC

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Н

SalI

TGCCTACGCC GACCTGTGCA ACATTCCGTC GACTATTATC AAGGGAGAGA AAATTTACAA TTCTCAAACT O! ß Н ĸ 闰 O H 222222 Д Z U ч А

111111 BamHI 141

CACTCACTGC CGCCCAGCTG TCTGCGACAT ACGACAACAT CCGCCTGTAC ACCTTCGGCG AACCGCGCAG GIGATACGAA ICTACAACTC GATACTAACT ACACCCTCAC GCCTTTCGAC ACCCTACCAC AATGCAACGG CAGCAGGTTA GCCAGTATCC GGACTACGCG CTGACCGTGA CCGGCCACKC CCTCGGCGCC TCCCTGGCGG GACATTAACG GATGGATCCT CCGCGACGAC AGCAGCAAAG AAATAATCAC CGTCTTCCGT GGCACTGGTA TTGTGAAGTA CACGGTGGAT ATTATATTGG ATGGGTCTCC GTCCAGGACC AAGTCGAGTC GCTTGTCAAA SLA H 闰 > E В В 드 ᆸ O1 X H D H × A А 0° 2 н H 듸 L T × > M ល വ × × ¥ А Z А K A A Ħ A A a o E F Ö Ō Ç N N > ø А 211 351 421 491 281

CGGCAATCAG GCCTTCGCGT CGTACATGAA CGATGCCTTC CAAGCCTCGA GCCCAGATAC GACGCAGTAT ø Н Ω Д Ŋ Ø ď O ď Ω Z × ល ď ഥ ď Z 561

TICCGGGICA CICAIGCCAA CGACGGCAIC CCAAACCIGC CCCCGGIGGA GCAGGGGIAC GCCCAIGGCG GIGIAGAGIA CIGGAGCGII GAICCIIACA GCGCCCAGAA CACAITIGIC IGCACIGGGG AIGAAGIGCA GIGCIGIGAG GCCCAGGGCG GACAGGGIGI GAAIAAIGCG CACACGACTI AITIIGGGAI GACGAGCGGC A 闰 CTG Ü G O! Ħ > **>** 댐 H ρι A Q N N N A Н Z Д Ø > 5 0 Н О Р U А Ö Z S < U H V E E C C **8** 771 631 701

FIG._37B

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls to Targette Expression of Genes Encoding Cell Wall..."

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	TCGTTCAAAC TAATTTCTGT TTTTATGAT GGATAAATTA				CCAATTCGCC	AAACCCTGGC	GAGGCCCGCA	GCGCATTAAG	CGCICCITIC	GGGCTCCCTT	GTTCACGTAG	TAGTGGACTC	ATTTTGCCGA	AAATATTAAC	TTCTAAATAC	AAAGGAAGAG	TGTTTTTGCT	TACATCGAAC	TGAGCACTTT	TCGCCGCATA	GGCATGACAG	TGACAACGAT	TGATCGTTGG	ATGGCAACAA	ACTGGATGGA	TGATAAATCT	TCCCGTATCG
	AAGAAGCAGA GATTATCATA ATGAGATGGG GCGCAAACTA				CGGTGGAGCT	GTGACTGGGA	TAATAGCGAA	CCCTGTAGCG	CCCTAGCGCC	TCTAAATCGG	TAGGGTGATG	CGTTCTTTAA	TTTATAAGGG	AATTTTAACA	TTGTTTATTT	TAATATTGAA	TTTGCCTTCC	ACGAGTGGGT	TTTCCAATGA	AGCAACTCGG	TCTTACGGAT	AACTTACTTC	TAACTCGCCT	GCCTGTAGCA	CAATTAATAG	GGTTTATTGC	TGGTAAGCCC
	D E L * ATGAGCTGTA GTCTTGCGAT GACGTTATTT AAAATATAGC I	2	XbaI	111111	_	TTACAACGTC	CCAGCTGGCG	ATGGGACGCG	CTTGCCAGCG	CCCGTCAAGC	AAAACTTGAT	TTGGAGTCCA	ATTCTTTGA	ATTTAACGCG	GAACCCCTAT	AATGCTTCAA	TTTGCGGCAT	AGTTGGGTGC	CGAAGAACGT	GCCGGGCAAG	CAGAAAAGCA	CACTGCGGCC	GGGGATCATG	ACACCACGAT	TTCCCGGCAA	CCGGCTGGCT	TGGGGCCAGA
	P L K D CCACTGAAGG CCTGTTGCCG TGTAATGCAT GATAGAAAAC HindIII	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Clai	111111111111111111111111111111111111111		GGCCGTCGTT	CCCCCTTTCG	TGAATGGCGA	GACCGCTACA	GCCGGCTTTC	TCGACCCCAA	CCCTTTGACG	ATCTCGGTCT	TTTAACAAAA	AATGTGCGCG	AACCCTGATA	TATTCCCTTT	GCTGAAGATC	GTTTTCGCCC	CCGTATTGAC	TCACCAGTCA	TGAGTGATAA	GCACAACATG	GACGAGCGTG	TTACTCTAGC	CTCGGCCCTT	ATTGCAGCAC
Noti	A A E GGCCGCGGAA AAGATTGAAT ATAATTAACA TTTAATACGC		ับ	1	GTTACTAGAT	CGCGCTCACT	TGCAGCACAT	TTGCGCAGCC	CGCGCAGCGT	CGCCACGTTC	TTACGGCACC	CGGTTTTTCG	ACTCAACCCT	AATGAGCTGA	TTTTCGGGGA	ATGAGACAAT	GTGTCGCCCT	AGTAAAAGAT	ATCCTTGAGA	CGGTATTATC	GGTTGAGTAC	GCCATAACCA	CCGCTTTTT	CATACCAAAC	GGCGAACTAC	CACTTCTGCG	TCGCGGTATC
	W P V A GGCCGGTCGC AAAGTTTTCTT TAAGCATGTA				TGTCATCTAT	TCGTATTACG	TTAATCGCCT	TTCCCAACAG	GTGGTGGTTA	CTTCCTTTCT	ATTTAGTGCT	CCCTGATAGA	CTGGAACAAC	TTGGTTAAAA	TAGGTGGCAC	GTATCCGCTC	CAACATTTCC	CGCTGGTGAA	CAGCGGTAAG	CTATGTGGCG	AGAATGACTT	ATGCAGTGCT	AAGGAGCTAA	TGAATGAAGC	ACTATTAACT	GTTGCAGGAC	AGCGTGGGTC
Sphi	T ACCT CAAT ACGT				TCGCGCGCGG	CTATAGTGAG	GTTACCCAAC	CCGATCGCCC	CGCGGCGGGT	GCTTTCTTCC	TAGGGTTCCG	TGGGCCATCG	TTGTTCCAAA	TTTCGGCCTA	GCTTACAATT	ATTCAAATAT	TATGAGTATT	CACCCAGAAA	TGGATCTCAA	TAAAGTTCTG	CACTATTCTC	TAAGAGAATT	CGGAGGACCG	GAACCGGAGC	CGTTGCGCAA	GGCGGATAAA	GGAGCCGGTG
	841 911 981 1051				1121	1191	9	1331	1401	1471	1541	1611	1681	1751	1821	1891	1961	2031	2101	2171	2241	2311	2381	2451	2521	2591	2661

-1G._37C

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls of Plant Cell Walls of Expression of Genes Encoding Cell Wall..."

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AGATAGGTGC TTTAAAACTT CCTTAACGTG CTTTTTTTCT GGATCAAGAG CTTCTAGTGT	GTTACCGGAT ACCTACACCG CGGACAGGTA CTGGTATCTT GGGGGGCGGA	TGATACCGCT ATACGCAAAC GGAAAGCGGG CTTTATGCTT GACCATGATT KhOI	TCGAGGTCAT TCAAAGTGA AATTTACTCT GAATTGGTTT GCTTTTGTAA TTTTGAGAAA	TTGCAGCGAT CCCTAAAGTC ACCCACCCCA ACCGCACGTC
CAGATCGCTG TTTAGATTGA GACCAAAATC TCTTGAGATC TTTGTTTGCC AAATACTGTC	CAAGACGATA GGAGCGAACG GGGAGAAAGG GGGGAAACGC ATGCTCGTCA	TTGAGTGAGC AGAGCGCCA TTTCCCGACT AGGCTTTACA AAACAGCTAT	GGGCCCCCCC GATTACCTGG CCCAAAGTGA ATTTTTGTAT TAAGTTCGTT TTGACATAAT	CTTGCCCCCG CAAAACAAC ACCCAACCCA TGTCCGCACC
ACGAAATAGA TCATATATACA ATAATCTCAT CAAAGGATCT CCAGCGGTGG CGCAGATACC	GGGTTGGACT AGCCCAGCTT GCTTCCCGAA GAGCTTCCAG GATTTTTGTG	ATTACCGCCT AGGAAGCGGA GCACGACAGG TAGGCACCCC TTCACACAGG	GCTGGGTACC ACAAAGGTAA TAAAAGGTGG TTGATACGTC AGTCGGTTTT	ATTAAAATAG AAAACATTTA GCCCAACCCA CACCGTGAGT GAAAAACAGC
CTATGGATGA CCAAGTTTAC ATCCTTTTTG TAGAAAGAT ACCACCGCTA TTCAGCAGG	GTGTCTTACC TCGTGCACAC AAAGCGCCAC GCGCACGAGG CTTGAGCGTC	GGATAACCGT TCAGTGAGCG AATGCAGCTG GCTCACTCAT GGATAACAAT	GGGAACAAAA CCAAAATAAA ATATCGGTAA TGTCGGTACT TCTGTATTTG	CAATAATAAG ACTTAGACTC AGCAAGCCCA CCGGCACTAT AAAAGAAAAA
AGTCAGGCAA AACTGTCAGA CTAGGTGAAG TCAGACCCCG AAACAAAAA GGTAACTGGC	GCGATAAGTC AACGGGGGGT GAGCTATGAG GAACAGGAGA CCACCTCTGA	CTGATTCTGT GCGCAGCGAG CCGATTCATT ATGTGAGTTA AATTGTGAGC	CCTCACTAAA TCGGGATAGT TATAAGTAAA GAGGATGTTT GAAATGCATA GAAATATCTT	CCACAATGAA TAAAAGATAA CACGATCCAT GTCTCCACCC
CACGACGGGG AAGCATTGGT TTAAAAGGAT CCACTGAGCG TGCTGCTTGC	GCTGCCAGTG GGTCGGGCTG CCTACAGCGT GGCAGGGTCG TCGGGTTTCG	GCGTTATCCC GAACGACCGA CGCGCGTTGG AACGCAATTA TGTTGTGTGG	CGCAATTAAC GAGAAGAGAG TAAAAGGTGG TATAAAAATT TCGCGATTTG ATTTGTATAA	CAGGCGAATT CTCTAGTAAAA TAAGTGCTATG CTGGCAAATA GAAAAAAAAAA
TAGTTATCTA CTCACTGATT CATTTTTAAT AGTTTTCGTT GCGCGTAATC CTACCAACTC	ACCAGTGGCT AAGGCGCAGC AACTGAGATA TCCGGTAAGC TATAGTCCTG	GTTCTTTCCT CGCCGCAGCC CGCCTCTCCC CAGTGAGCGC CCGGCTCGTA	ACGCCAAGCG TCATATGCTT AAACATCAGT TTTCTACTAT TTAAGTTTAT ATACAGAGGG	AATATATATT GGGTATTTTT CTAAAGCCCA GTGCAGCCAA TCGCAGCCAA
273 80 10 10 10 10 10	3221 3221 3361 3431 3501 3571	447 447 447 447 447 447 447 447 447 447	3991 4061 4131 4201 4271 4341	4411 4481 4551 4621

FIG._37D

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by angelous 209.070202 Expression of Genes Encoding Cell Wall SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 64 of 154

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CTCGGATGTA GATCTTCTTT CTTTCTTCTT CCTCAGCATT GTTCATCGGT AGTTTTTCTT TTCATGATTT CCTCCCCT CCGCCGCGC CTCGGTCTCG ATCTTTGGCC GGAGGGCGG GATCTCGCGG Bglii GAATGGGGCT TCGGTGCGCG TTTTTTCGT AGCTCCTCCC TCGGCCCGGA TCCTCGCGGG CCCCTCGCTG CCGGACGACG TCCTCTTTCT TTCTCCGTTT GAGCGGCTTC GTCGCCCAGA CGGAGCTTTT TTGTAGC 222222

BamHI

TTTGTGGTAG AATTTGAATC

CGGGCGTGAG

5111 5181 5251

CAGCCTCGTG

GTGACAAATG

CCACCACCAC CGGTAACCAC TTGGTAGTTT CTGGCGTCTC

CGGCCCTCCC TCCGCTTCCA AAGAAACGCC

CCTACCACCA

TCCCCCCAAC

CGACGAGGCC

GCGAGGAGGA TCGCGAGCAG

TCTCCTCCCA

TACCCCCCC

ACTATATACA

CCCCATCGCC CACCTCCTCC

4831 4901 CCCCCCTC GGGTGGCCGA

4971 5041

GGCCGGAAAA

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted 2 2 2 2 Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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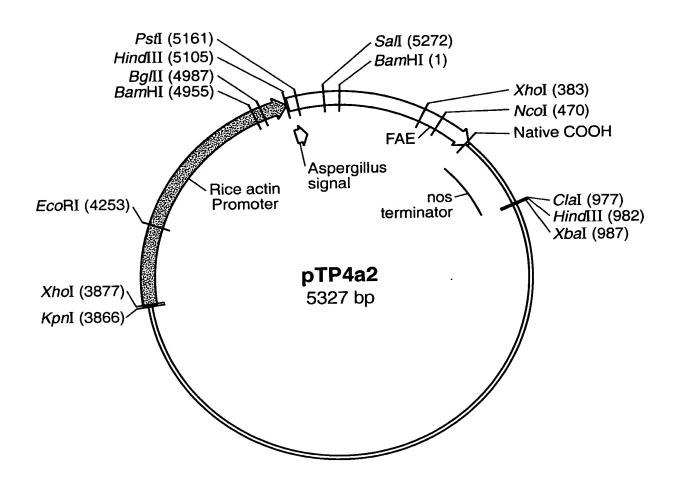


FIG._38A

121111

CAACTCGATA CTAACTACAC CCTCACGCCT TTCGACACCC TACCACAATG CAACGGTTGT GAAGTACACG GIGGAIATIA TATIGGAIGG GICICCGICC AGGACCAAGI CGAGICGCII GICAAACAGC AGGITAGCCA CAGCTGTCTG CGACATACGA CAACATCCGC CTGTACACCT TCGGCGAACC GCGCAGCGGC AATCAGGCCT CTGGTAGTGA TACGAATCTA STATCCGGAC TACGCGCTGA CCGTGACCGG CCACKCCCTC GGCGCCTCCC TGGCGGCACT CACTGCCGCC L A A ĸ Ö H GCAAAGAAAT AATCACCGTC TTCCGTGGCA ß Ö E S **₹** œ H H X > O BamHI H A A O S < E > 闰 ĸ > Ŋ GATCCTCCGC GACGACAGCA **⊠** Ø 4 А А r S r D × ρι

T A A

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TCGCGTCGTA CATGAACGAT GCCTTCCAAG CCTCGAGCCC AGATACGACG CAGTATTTCC GGGTCACTCA ρ4 NCOL Ē ø ρι Ŋ Ø O Ŀ ď A Z Σ ស ď 351

281

141

211

AGGGCGGACA GGGTGTGAAT AATGCGCACA CGACTTATTT TGGGATGACG AGCGGAGCCT GTACATGGTG GGTGGAGCAG GGGTACGCCC ATGGCGGTGT AGAGTACTGG 闰 U O Ö ល Ħ G G Ü H υ H H TGCCAACGAC GGCATCCCAA ACCTGCCCCC H Þ z Z Ö Ö Z 421 491 561

TTGAATCCTG TTAACATGTA GCGTAACCAC ATGCATGACG TTATTATGA GATGGGTTTT TATGATTAGA GTCCCGCAAT TATACATTTA ATACGCGATA TTTCTTAAGA AGAGGGGCC CATGTAATAA GATGTCCTGG GGCAATAAAG TTACGTTAAG CGAGTGTACC AGGAAGATG AGCAGATCGT TCAAACATTT TTCTGTTGAA TGCGATGATT ATCATATAT GCTGTAAAGA TCAGCCTCCC ATCAGTCATT TGAAGGATGA TIGCCGGICT 631 701 771 841

GAAAACAAAA TATAGCGCGC AAACTAGGAT AAATTATCGC GCGCGGTGTC ATCTATGTTA CTAGATCGAT XbaI 911

HindIII

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AGGCAACTAT AAAAAACCA ACTGGCTTCA TATGAGAAAG CTCTGACTTG CGGCCTTTTT CCAAACGACG TCTGCGCTCG GGTATCATTG ACCCCGTAGA AGAACTCTGT TAAGTCGTGT GGGGGTTCGT ACGITCGCCG GGCACCTCGA TTTTCGCCCT AACCCTATCT AGCTGATTTA CGGGGAAATG GACAATAACC CGCCCTTATT AAAGATGCTG TTGAGAGTTT ATTATCCCGT GAGTACTCAC TAACCATGAG TTTTTGCAC AACTACTTAC GTCAGACCAA GTGAAGATCC AGGAGAGCGC GCACATCCCC GCAGCCTGAA CAGCGTGACC CTCACTGGCC TCCGAAGGTA GCTTGCAAAC CACCACTTCA CCAGTGGCGA GCCAGCAACG AACAACACTC TTAAAAATG GGTGAAAGTA GGTAAGATCC GTGGCGCGGT TGACTTGGTT AGCTAACCGC TTAACTGGCG CAGGACCACT ACGGGGGAGTC ATTGGTAACT AAGGATCTAG TGAGCGTCAG GGGCTGAACG CAGCGTGAGC GGGTCGGAAC GTTTCGCCAC ATTACGCGCG CTTTCTCGCC AGTGCTTTAC GATAGACGGT TGGCACTTTT ATTTCCGTGT AGTGCTGCCA TGAAGCCATA TGGGTCTCGC CAACAGTTGC TGGTTACGCG CCGCTCATGA TCGCCTTGCA AGAATTATGC GGACCGAAGG TATCTACACG CTGATTAAGC TTTAATTTAA TTCGTTCCAC GTAATCTGCT CAACTCTTTT GTGGCTGCTG GAGATACCTA GTAAGCGGCA GTCCTGTCGG TCGTCAGGGG GGCGGAGCCT ATGGAAAAC AGTGAGTCGT GTTCCGATTT TCCAAACTGG AGTATTCAAC CAGAAACGCT TCTCAACAGC GTTCTGCTAT ATTCTCAGAA CGGAGCTGAA GCGCAAACTA CCGGTGAGCG GTAGTTAGGC CGCAGCGGTC GGCCTATTGG ACAATTTAGG AAATATGTAT GATAAAGTTG TCGCCCTTCC GCGGCTGTGG CCATCGCCCT CCCAACTTAA TCTTCCCTTC AAACTTCATT TTCGCCCTAT TCCCTTTAGG ATTAACGCTT AAATACATTC GAAGAGTATG TTTGCTCACC TCGAACTGGA CACTTTTAAA CGCATACACT TGACAGTAAG AACGATCGGA CGTTGGGAAC GATGGAGGCG AAATCTGGAG GTATCGTAGT AGGTGCCTCA AACGTGAGTT CAAGAGCTAC TAGTGTAGCC CCTGTTACCA CCGGATAAGG ACACCGAACT CAGGTATCCG TATCTTTATA CCTTTCGCTT ACGTAGTGGG GGACTCTTGT CAACAACGTT TTTTCTGCGC ATTAAGCGCG CCTGGCGTTA CCCGCACCGA TGCCGATTTC GATTGATTTA CGAACGACCT AAACGCCTGG TACTTCTGAC TAATAGACTG TATTGCTGAT TCGCTGAGAT AAAATCCCTT GAGATCCTTT TTTGCCGGAT CTCTGCTAAT GAAAGGCGGA TTATTTTCT CCTTCCTGTT GTGGGTTACA CAATGATGAG ACTCGGTCGC ACGGATGGCA TCGCCTTGAT GTAGCAATGG AAGCCCTCCC ACTGTCCTTC ACGATAGTTA CTTTAATAGT TAAGGGATTT TTAACAAAAT ATTGAAAAAG GGAGCTCCAA GTAGCGGCGC AGCGCCCGCT AATCGGGGGC GTGATGGTTC CTGGGAAAAC AGCGAAGAGG CTTCAATAAT TGGACTCAAG TTTGTGATGC TCAAGCTCTA GGCAAGAGCA AAAGCATCTT TCTCATGACC CGGTGGTTTG GATACCAAAT ACATACCTCG CAGCTTGGAG TTCCAGGGG CCAGCGCCCT TTTTGATTTA AACGCGAATT CGGCATTTTG GGGTGCACGA GAACGTTTTC GCGGCCAACT ATCATGTAAC CACGATGCCT CGGCAACAAT CTGGCTGGTT GCCAGATGGT AATAGACAGA ATATACTTTA GGATCTTCTT CCCGAAGGGA AGCGGCCGGT CTGGCGTAAT GACGCGCCCT CTTGATTAGG AGTCCACGTT CCCTATTTGT AACGTCGTGA AACATGGGGG GTTTACTCAT TTTTTGATAA CCGCTACCAG GCAGAGCGCA AGCACCGCCT CAGTCACAGA CAGCACTGGG GGATGAACGA AAAGATCAAA CTTACCGGGT GCACACAGCC GCCACGCTT AAGCTTCTAG ATTGACGCCG TCTAGCTTCC GCCCTTCCGG ACGAGGGAGC AGCGTCGATT GTCGTTTTAC GCTACACTTG GCTTTCCCCG CCCCAAAAA **LTGACGTTGG** ACAAAAATTT CCCTTTTTG AAGATCAGTT TGATAACACT AGCGTGACAC CTTTCGCCAG TGGCGAATGG CGGTCTATTC TGCGCGGAAC CTGATAAATG TCGCCCCGAA 2381 3081 3151 331 1401 471 541 611 681 .751 821 1891 961 2031 2101 2171 2241 2311 2451 521 591 2661 2731 2801 2871 2941 3011 3221 3361 191 261 3291 1121

FIG._38C

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GGGAT TCAG TAATG GCTC GGGAT	CCAA ATAT TGTC TCTG	CAAT CAAT CAAT CAGG CAAAAAAAAAAAAAAAAAAA	GGGGAAT ATTGTTC HindIII AAGCTTA
TTCTGTGGAT AGCGAGTCAG TTCATTAATG GAGTTAGCTC GTGAGCGGAT	GATAGTCCAA AGTAAAATAT ATGTTTTGTC TGCATATCTG TATCTTTAAA	AC AATGAACAAT AA AGATAAACTT GG ATCCATAGCA AT AGAAAAAAAA GC GAGCAGCGAC GC CCCCCTCT GG ACGACGACCT GG ACGACGAGCT GT CCGTTTTTT GG CCCAGATCGG BAMHI	PAGC COPA
TATCCCTGA GACCGAGCGC CGTTGGCCGA CAATTAATGT GTGTGGAATT ATTAACCCTC	AGAGAGTCGG AGGTGGTATA AAAATTGAGG GATTTGGAAA GTATAAGAAA	CGAATTCCAC GTAAAATAAA GCTATGCACG CAAATAGTCT AAAAAAAGAA GGAGGATCGC TATACATACC TCGCTGCCGG CTTTCTTTCT GGCTTCGTCG	CCCGGATCC
TTTCCTGCGT GCAGCCGAAC TCTCCCCGCG GAGCGCAACG CTCGTATGTT CAAGCGCGCA	ATGCTTGAGA ATCAGTTAAA TACTATTATA GTTTATTCGC AGAGGGATTT	TATATTCAGG ATTTTTTTA AGCCCAAGT AGCCAACTGG AGCCAAAAAA GGAAAAGCGA ATCGCCACTA TCCTCCCCCC CCCTCTCCT GGGCGAGGCGA	G CGTGAGTCGG Bglii GTGGTAGAATT C CTCGTGCGGA
TCACATGTTC ACCGCTCGCC GCAAACCGCC AGCGGGCAGT ATGCTTCCGG ATGATTACGC	GGTCATTCAT AAGTGAAAAC TACTCTTTTC TGGTTTTTAA	GAGAAAAATA AGCGATGGGT AAAGTCCTAA ACCCCAGTGC CACGTCTCGC CGTGGGGGCC AACGCCCCCC AACGCCCCCC AACGCCCCCC	CGTCTCCGGG CTTCTTTTG CAAATGCAGC
GGCCTTTTGC T GTGAGCTGAT A CGCCCAATAC G CCGACTGGAA A TTTACACTTT A AGCTATGACC A	CCCCCCCGA GG ACCTGGTCAA AA AAGTGAAATT TA TTGTATGAAT TI	CATAATTTTT CCCCCGTTGC AACCCCACCC CGCACCACCG GGGTCCGGGT CTTCCAAAGA CCACCACCACCG CCACCACCG CGCCCCCCCC	TCGCGGCTGG TTCTTTCTTT TGATTTGTGA
GCCTTTTGCT CCGCCTTTGA AGCGGAAGAG GACAGGTTTC CACCCCAGGC CACCCCAGGC	GGTACCGGGC AGGTAAGATT AGGTGGCCCA TACGTCATTT GGTTTTTAAG	GCTAATTTGA AAATAGCTTG CATTTACAAA AACCCAACCC	GGGCGGGATC GATGTAGATC TTTCTTTTCA
ACGGTTCCTG AACCGTATTA TGAGCGAGGA CAGCTGGCAC ACTCATTAGG	ACAAAAGCTG AATAAAACAA CGGTAATAAA GGTACTTTGA TATTTGAGTC	AAACCCATAT AATAAGATTA AGACTCAAAA AGCCCAGCCC	TGCGCGGGAG GGGGCTCTCG ATCGGTAGTT
3431 3501 3571 3641 3711	3851 3921 3991 4061 4131	44444444444444444444444444444444444444	4901

FIG._38D

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeton 1209 0702020 Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 69 of 154

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PstI

GAAATGGCCA

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Z ATCAAGGGAG AGAAATTTA GTCGACTATT Ŋ

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5251

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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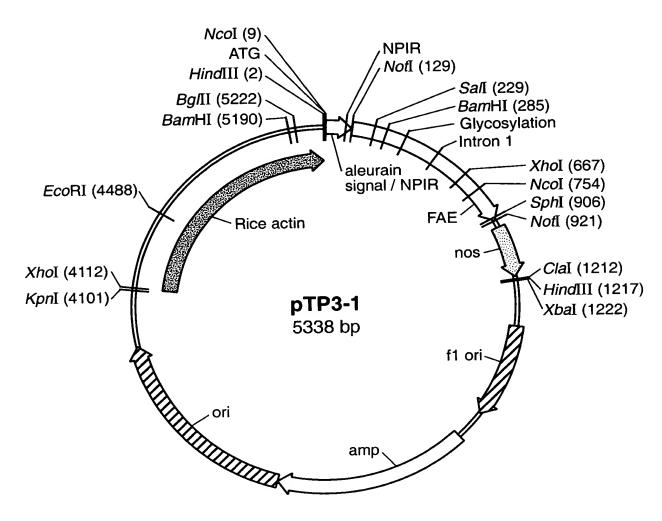


FIG._39A

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NotI NPIR

GGCCACGGCC

TCGCCGTGCT

CTCCTGGCGC

CCGCGTCCTC

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ß GACCGCGCGG 4 跘 Α GCCGGTCACC H Д ACCCGATCCG Z GCCGACTCCA ໝ А 4 CTCCTCCTTC 댐 ល ß ល TCGCCTCCTC ល 4

TGCCTACGCC ATGGCCACTA TCCGAAGACC TCTACAGCCG TTTAGTCGAA Ω 闰 ß GCAGGGCATC O 141 71

SalI

O TTCTCAAACT Ø ຜ AAGGGAGAGA AAATTTACAA Z × 闰 O ĸ GACTATTATC Н ACATTCCGTC Д Z GACCTGTGCA U Н 211

BamHI

GGCACTGGTA GTGATACGAA Ø Ö H Ü CCGCGACGAC AGCAGCAAAG AAATAATCAC CGTCTTCCGT 吆 ſυ 臼 ĸ ß ß A A ĸ GATGGATCCT Н 3 281

Glycosylation

Ü U GCCTTTCGAC [24 ACACCCTCAC TCTACAACTC O 351

GTCCAGGACC AAGTCGAGTC 0 O CACGGTGGAT ATTATATTGG ATGGGTCTCC Ö G 421

TCCCTGGCGG CACTCACTGC CCTCGGCGCC Ü GGACTACGCG CTGACCGTGA CCGGCCACKC U H GCCAGTATCC 491

TCTGCGACAT ACGACAACAT CCGCCTGTAC ACCTTCGGCG AACCGCGCAG CGGCAATCAG r r œ Ø CGCCCAGCTG O 561

NCOL

HindIII

Н

AAGCTTACCA TGGCCCACGC

Σ

XhoI

TTCCGGGTCA ĸ GCCCAGATAC GACGCAGTAT Ø CAAGCCTCGA CGATGCCTTC CGTACATGAA Z Σ GCCTTCGCGT 631

闰 > Ö NCOL Ħ Ö 闰 Д Z Ö ď H

CCCCGGTGGA GCAGGGTAC GCCCATGGCG GTGTAGAGTA TGCACTGGGG ATGAAGTGCA GTGCTGTGAG 闰 υ Ö H GATCCTTACA GCGCCCAGAA CACATTTGTC Ēų CGACGGCATC CCAAACCTGC × CTCATGCCAA CTGGAGCGTT 771 701

H U 5 2 2 2 Ö S H Σ Ö × Н H Ħ 4 Z Z Ö O Ö O O

Sphi

GCATGCACCT GACGAGCGGC CACACGACTT ATTTTGGGAT GCCCAGGCCG GACAGGGTGT GAATAATGCG 841

Noti

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CATTTGGCAA TTGAATTACG TTAGAGTCCC ATCGCGCGCG AAAGAAGCAG ATCGTTCAAA AGGATAAATT ATAATTTCTG GTTTTTATGA CGCGCAAACT TGATTATCAT TATGAGATGG ACCACTGAAG GATGAGCTGT CGATAGAAA CAAAATATAG GGTCTTGCGA TGACGTTATT ATGTAATGCA TCCTGTTGCC ATTTAATACG GGCCGCGGAA TAAGATTGAA AATAATTAAC GGCCGGTCGC TTAAGCATGT GCAATTATAC TAAAGTTTCT 981 1051 1121

HindIII

Xbar

CGTTACCCAA ACCGATCGCC CCTATAGTGA CCGGTGGAGC TCCAATTCGC AGAGGCCCGC AAAACCCTGG CGTGACTGGG GTAATAGCGA TCTAGAGCGG TTTACAACGT GCCAGCTGGC TGTTACTAGA TCGATAAGCT TGGCCGTCGT TCCCCCTTTC TTGCAGCACA GCGCGCTCAC GTGTCATCTA GTCGTATTAC CTTAATCGCC 1191 1261 1331

-1G._39C

CTGAATGGCG AATGGGACGC GCCCTGTAGC

GTTGCGCAGC

CTTCCCAACA

1401

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GGCGCATTAA

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ATCCGGTAAG AGCCTATGGA TGTTCTTTCC TCGCCGCAGC CCGCCTCTCC GCAGTGAGCG TAAGGCGCAG GAACTGAGAT TTATAGTCCT TCGGAGGACC GGAACCGGAG ACGTTGCGCA AGGCGGATAA TGGAGCCGGT GTAGTTATCT CCTCACTGAT TCATTTTAA GAGTTTTCGT TGCGCGTAAT GCTACCAACT TAGCCGTAGT TACCAGTGGC GTATGAGTAT TCACCCAGAA CTGGATCTCA TTAAAGTTCT ACACTATTCT GTAAGAGAAT CGCTTACAAT CATTCAAATA TTAGGGTTCC GTGGGCCATC CTTGTTCCAA ATTTCGGCCT CGCTTTCTTC CCTTCTAGTG GCGGACAGGT AGGGGGCGG TTTGCTCACA CTGATACCGC AATACGCAAA TGGAAAGCGG GACTGGATGG CGGATCAAGA AGTTACCGGA CCTGGTATCT AATGGCAACA GAGATAGGTG ATTTAAAACT CCCTTAACGT CCTTTTTTC CTAATCCTGT GACCTACACC GATTTTGCCG TGGCATGACA CTGACAACGA TTGATCGTTG CTGATAAATC CTCCCGTATC ATAGTGGACT AAAATATTAA TTTCTAAATA AAAAGGAAGA CTGTTTTTGC TTACATCGAA ATGAGCACTT GTCGCCGCAT GGGCTCCT GGTTCACGTA CCGCTCCTTT AAGAGCGCCC TAATGCAGCT GGCACGACAG GTTTCCCGAC ACAGATCGCT CTTTAGATTG TGACCAAAAT TTCTTGAGAT CAAATACTGT CCTCGCTCTG TCAAGACGAT TGGAGCGAAC AGGGAGAAAG GGGGGAAACG GATGCTCGTC TTGCTGGCCT TTTGAGTGAG CACGAGTGGG TTTCCAATG GAGCAACTCG ATCTTACGGA GTAACTCGCC TGCCTGTAGC ACAATTAATA TGGTTTATTG ATGGTAAGCC GTTTGTTTGC ATAATATTGA CAACTTACTT CTCTAAATCG TTAGGGTGAT ACGTTCTTTA ATTTATAGG GAATTTTAAC TTTGTTTATT TTTTGCCTTC GCCCTAGCGC GAGGAAGCGG TCCGGCTGGC CTGGGGCCAG AACGAAATAG GCGCAGATAC CGCCTACATA CGGGTTGGAC CAGCCCAGCT CGCTTCCCGA GGAGCTTCCA CGATTTTTGT TCCTGGCCTT TATTACCGCC CTTCCCGGCA CTCATATATA GATAATCTCA TCAAAGGATC ACCAGCGGTG GACACCACGA TATTCTTTG AAATGCTTCA ACAGAAAAGC GGGGGATCAT ACTTGCCAGC CCCCGTCAAG AAAAACTTGA GTTGGAGTCC AATTTAACGC GGAACCCCTA TTTTGCGGCA CAGTTGGGTG CCGAAGAACG CGCCGGGCAA ACACTGCGGC AGCGCACGAG ACTTGAGCGT TGGATAACCG ACTATGGATG ACCAAGTTTA AACCACCGCT CTTCAGCAGA TCTGTAGCAC CGTGTCTTAC TTCGTGCACA GAAAGCGCCA TTTTTACGGT GTCAGTGAGC CTCACCAGTC ATGAGTGATA CTTACTCTAG GCTCGGCCCT GATCCTTTTT GTAGAAAGA TTATTCCCTT TGCTGAAGAT AGTTTTCGCC TGCACAACAT CGACGAGCGT CATTGCAGCA TATCTCGGTC ATTTAACAAA AAATGTGCGC TAACCCTGAT CCCGTATTGA TGACCGCTAC CGCCGGCTTT GCCCTTTGAC CTCGACCCCA GCCGATTCAT GAACGGGGGG GGAACAGGAG GCCACCTCTG CAACGCGGCC CCTGATTCTG AGCGCAGCGA TGCCATAACC TAACTGTCAG CAAACAAAAA AGGTAACTGG CTTCAAGAAC GGCGATAAGT TGAGCTATGA GCGGTATTAT ACCGCTTTTT CTCGCGGTAT GAGTCAGGCA TCTAGGTGAA GTCAGACCCC AAATGAGCTG CTTTTCGGGG AAGTAAAAGA GATCCTTGAG TGGTTGAGTA CCATACCAAA TGGCGAACTA CCACTTCTGC TCGCCACGTT CACTCAACCC CATGAGACAA CGTGTCGCCC ACGCGCAGCG TTTACGGCAC ACGGTTTTTC CTTTTTCCGA ACCTACAGCG CGGCAGGGTC AAAACGCCAG FGCGTTATCC CGAACGACCG CCCCCCTTG ACACGACGGG TAAGCATTGG CTGCTGCTTG TAGGCCACCA CGGTCGGGCT GTCGGGTTTC GAAGGAGCTA TTTAAAAGGA TCCACTGAGC TGCTGCCAGT ACGCTGGTGA AGTTGCAGGA SAGCGTGGGT GCCCTGATAG ACTGGAACAA ATTGGTTAAA ACAGCGGTAA GCTATGTGGC CAGAATGACT TATGCAGTGC CTGAATGAAG AACTATTAAC TGTGGTGGTT CCTTCCTTTC TTAGGTGGCA TGTATCCGCT TCAACATTTC GATTTAGTGC 3291 3361 3431 501 571 3641 3781 2381 2451 2521 2591 2661 2731 2801 2871 2941 3011 3081 3151 3221 3711 1891 961 2031 2101 2171 2241 2311 1751 1821 1611 1681

FIG._39D

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-1G._39E

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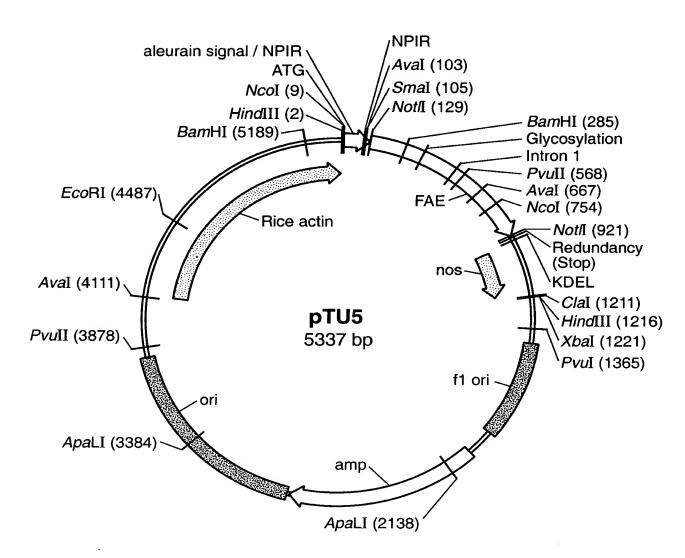


FIG._40A

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Furgeted 1 2 0 9 C 7 0 2 0 2 Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 76 of 154

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	HindIII No	an T			
	ATHOTTI NO	~~~			
1					TCGCCGTGCT AGCGGCACGA
51					GCCGACTCCA CGGCTGAGGT
	SmaI				
	AvaI		No	tI	
404	~~~~~		~~~	~~~~	
101	ACCCGGGCCG TGGGCCCGGC	GCCCGTCACC CGGGCAGTGG			
151		TCTACAGCCG AGATGTCGGC			
201		GACCTGTGCA CTGGACACGT			
				BamHI	
251	AAATTTACAA	TTCTCAAACT	GACATTAACG	GATGGATCCT	CCGCGACGAC
		AAGAGTTTGA			
301	AGCAGCAAAG	AAATAATCAC	CGTCTTCCGT	GGCACTGGTA	GTGATACGAA
		TTTATTAGTG			
351		GATACTAACT			
	AGATGTTGAG	CTATGATTGA	TGTGGGAGTG	CGGAAAGCTG	TGGGATGGTG
401		TTGTGAAGTA			
	TTACGTTGCC	AACACTTCAT	GTGCCACCTA	TAATATAACC	TACCCAGAGG
451		AAGTCGAGTC			
	CAGGTCCTGG	TTCAGCTCAG	CGAACAGTTT	GTCGTCCAAT	CGGTCATAGG
501	GGACTACGCG	CTGACCGTGA	CCGGCCACKC	CCTCGGCGCC	TCCCTGGCGG
	CCTGATGCGC	GACTGGCACT	GGCCGGTGMG	GGAGCCGCGG	AGGGACCGCC
		PvuII			
551	CACTCACTGC	CGCCCAGCTG	TCTGCGACAT	ACGACAACAT	CCGCCTGTAC
		GCGGGTCGAC			
601	ACCTTCGGCG	AACCGCGCAG	CGGCAATCAG	GCCTTCGCGT	CGTACATGAA
	TGGAAGCCGC	TTGGCGCGTC	GCCGTTAGTC	CGGAAGCGCA	GCATGTACTT
		AvaI			
		~~~~~	· ·		
651	CGATGCCTTC	CAAGCCTCGA GTTCGGAGCT	GCCCCCCCC	GACGCAGTAT	TTCCGGGTCA
	GCIACGGAAG	GIICGGAGCT	CGGGTCTATG	CTGCGTCATA	AAGGCCCAGT

### **FIG._40B**

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701					GCAGGGGTAC
	Ncol	GCIGCCGIAG	GGIIIGGACG	GGGGCCACCT	CGTCCCCATG
	~~~~~				
751	GCCCATGGCG	GTGTAGAGTA	CTGGAGCGTT	GATCCTTACA	GCGCCCAGAA
	CGGGTACCGC	CACATCTCAT	GACCTCGCAA	CTAGGAATGT	CGCGGGTCTT
801	CACATTTGTC	TGCACTGGGG	ATGAAGTGCA	GTGCTGTGAG	GCCCAGGGCG
			TACTTCACGT		
851	GACAGGGTGT	GAATAATGCG	CACACGACTT	ATTTTGGGAT	GACGAGCGGC
			GTGTGCTGAA		
			NotI		
901	GCATGCACCT			ССУСТСУУСС	ATGAGCTGTA
			CCGGCGCCTT		
951	AAGAAGCAGA	TCGTTCAAAC	ATTTGGCAAT	AAAGTTTCTT	AAGATTGAAT
			TAAACCGTTA		
1001	CCTGTTGCCG	GTCTTGCGAT	GATTATCATA	TAATTTCTGT	TGAATTACGT
	GGACAACGGC	CAGAACGCTA	CTAATAGTAT	ATTAAAGACA	ACTTAATGCA
1051	TAAGCATGTA	ATAATTAACA	TGTAATGCAT	GACGTTATTT	ATGAGATGGG
	ATTCGTACAT	TATTAATTGT	ACATTACGTA	CTGCAATAAA	TACTCTACCC
1101			CAATTATACA		
			GTTAATATGT		_
1151	AAAATATAGC	GCGCAAACTA	GGATAAATTA	TCGCGCGCGG	TGTCATCTAT
	TTTTATATCG	CGCGTTTGAT	CCTATTTAAT	AGCGCGCCC	ACAGTAGATA
			XbaI		
		.aI HindIII	 [
1201	GTTACTAGAT	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	CMA CA CCCCC	GGGTGGT GGT	CC2.2. TTTCCCC
1201	CAATGATCTA				
1251	CTATAGTGAG	TCGTATTACG	CGCGCTCACT	GGCCGTCGTT	TTACAACGTC
	GATATCACTC				
1301	GTGACTGGGA	AAACCCTGGC	GTTACCCAAC	ТТААТССССТ	TGCAGCACAT
	CACTGACCCT				
		PvuII			
1351	CCCCCTTTCG	CCACCTGGCC	ጥል አጥል ሮሮሮ ል አ	CACCCCCCC	CCCAMCCCC
	GGGGGAAAGC	GGTCGACCGC	ATTATCGCTT	CTCCGGGCGT	GGCTAGCGGG
1401	TTCCCAACAG	TTGCGCAGCC	TGAATGGCGA	ATGGGACGCG	СССТСТАССС
-	AAGGGTTGTC				

FIG._40C

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls of Plant Cell Walls of Plant Cell Walls..."

Expression of Genes Encoding Cell Wall...

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1451		CGCGGCGGGT GCGCCGCCA			-
1501		CCCTAGCGCC GGGATCGCGG			
1551		GCCGGCTTTC			
1601		CGGCCGAAAG			CCCGAGGGAA
	ATCCCAAGGC	TAAATCACGA	AATGCCGTGG	AGCTGGGGTT	TTTTGAACTA
1651		GTTCACGTAG CAAGTGCATC		CCCTGATAGA GGGACTATCT	CGGTTTTTCG GCCAAAAAGC
1701		TTGGAGTCCA AACCTCAGGT			TTGTTCCAAA AACAAGGTTT
1751	CTGGAACAAC GACCTTGTTG		ATCTCGGTCT TAGAGCCAGA		TTTATAAGGG AAATATTCCC
1801	ATTTTGCCGA		TTGGTTAAAA		TTTAACAAAA
1851		AAAGCCGGAT AATTTTAACA	AACCAATTTT	TTACTCGACT	AAATTGTTTT TAGGTGGCAC
	TAAATTGCGC	TTAAAATTGT	TTTATAATTG	CGAATGTTAA	ATCCACCGTG
1901		AATGTGCGCG TTACACGCGC			
1951	ATTCAAATAT TAAGTTTATA		ATGAGACAAT TACTCTGTTA		AATGCTTCAA TTACGAAGTT
2001		AAAGGAAGAG TTTCCTTCTC	TATGAGTATT ATACTCATAA		
2051		TTTGCGGCAT AAACGCCGTA	TTTGCCTTCC AAACGGAAGG		CACCCAGAAA GTGGGTCTTT
				Apal	LI
2101		AGTAAAAGAT TCATTTTCTA			
2151		TGGATCTCAA ACCTAGAGTT			
2201		TTTCCAATGA AAAGGTTACT			
2251		CCGTATTGAC GGCATAACTG			
2301	CACTATTCTC	AGAATGACTT TCTTACTGAA	GGTTGAGTAC	TCACCAGTCA	CAGAAAAGCA

FIG._40D

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeter The Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 79 of 154

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2351		GGCATGACAG CCGTACTGTC			
2401		CACTGCGGCC GTGACGCCGG		TGACAACGAT ACTGTTGCTA	CGGAGGACCG GCCTCCTGGC
2451		CCGCTTTTTT GGCGAAAAAA		GGGGATCATG CCCCTAGTAC	TAACTCGCCT ATTGAGCGGA
2501	TGATCGTTGG ACTAGCAACC	GAACCGGAGC CTTGGCCTCG	TGAATGAAGC ACTTACTTCG	CATACCAAAC GTATGGTTTG	GACGAGCGTG CTGCTCGCAC
2551		GCCTGTAGCA CGGACATCGT		CGTTGCGCAA GCAACGCGTT	ACTATTAACT TGATAATTGA
2601	GGCGAACTAC CCGCTTGATG	TTACTCTAGC AATGAGATCG	TTCCCGGCAA AAGGGCCGTT	CAATTAATAG GTTAATTATC	ACTGGATGGA TGACCTACCT
2651	GGCGGATAAA CCGCCTATTT	GTTGCAGGAC CAACGTCCTG	CACTTCTGCG GTGAAGACGC	CTCGGCCCTT GAGCCGGGAA	CCGGCTGGCT GGCCGACCGA
2701		TGATAAATCT ACTATTTAGA		AGCGTGGGTC TCGCACCCAG	TCGCGGTATC AGCGCCATAG
2751	ATTGCAGCAC TAACGTCGTG	TGGGGCCAGA ACCCCGGTCT	TGGTAAGCCC ACCATTCGGG		TAGTTATCTA ATCAATAGAT
2801	CACGACGGGG GTGCTGCCCC	AGTCAGGCAA TCAGTCCGTT	CTATGGATGA GATACCTACT	ACGAAATAGA TGCTTTATCT	CAGATCGCTG GTCTAGCGAC
2851	AGATAGGTGC TCTATCCACG	CTCACTGATT GAGTGACTAA		AACTGTCAGA TTGACAGTCT	CCAAGTTTAC GGTTCAAATG
2901	TCATATATAC AGTATATATG	TTTAGATTGA AAATCTAACT	TTTAAAACTT AAATTTTGAA	САТТТТТААТ GTAAAAATTA	TTAAAAGGAT AATTTTCCTA
2951	CTAGGTGAAG GATCCACTTC	ATCCTTTTTG TAGGAAAAAC	ATAATCTCAT TATTAGAGTA	GACCAAAATC CTGGTTTTAG	CCTTAACGTG GGAATTGCAC
3001		CCACTGAGCG GGTGACTCGC			
3051		CTTTTTTTCT GAAAAAAAGA			
3101		CCAGCGGTGG GGTCGCCACC			
3151	TTTTTCCGAA AAAAAGGCTT	GGTAACTGGC CCATTGACCG			
3201	CTTCTAGTGT GAAGATCACA	AGCCGTAGTT TCGGCATCAA			
3251	GCCTACATAC CGGATGTATG	CTCGCTCTGC GAGCGAGACG			

FIG._40E

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Cargarett Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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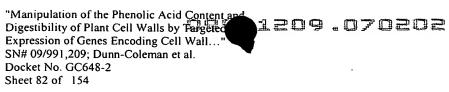
		00	7 10 1		
3301			GGGTTGGACT CCCAACCTGA		
				ApaLI	
3351			AACGGGGGGT TTGCCCCCCA		
3401	GGAGCGAACG CCTCGCTTGC		AACTGAGATA TTGACTCTAT	CCTACAGCGT GGATGTCGCA	GAGCTATGAG CTCGATACTC
3451			GGGAGAAAGG CCCTCTTTCC		TCCGGTAAGC AGGCCATTCG
3501			GCGCACGAGG CGCGTGCTCC		GGGGAAACGC CCCCTTTGCG
3551		TATAGTCCTG ATATCAGGAC		CCACCTCTGA GGTGGAGACT	
3601			GGGGGGCGGA CCCCCCGCCT		AAACGCCAGC TTTGCGGTCG
3651			CCTGGCCTTT GGACCGGAAA		
3701			CTGATTCTGT GACTAAGACA		
3751	TTGAGTGAGC	TGATACCGCT	CGCCGCAGCC GCGGCGTCGG	GAACGACCGA	
3801	TCAGTGAGCG	AGGAAGCGGA	AGAGCGCCCA TCTCGCGGGT	ATACGCAAAC	CGCCTCTCCC
			PvuII		
3851			AATGCAGCTG TTACGTCGAC		
3901	GGAAAGCGGG CCTTTCGCCC	CAGTGAGCGC GTCACTCGCG	AACGCAATTA TTGCGTTAAT	ATGTGAGTTA TACACTCAAT	GCTCACTCAT CGAGTGAGTA
3951			CTTTATGCTT GAAATACGAA		
4001	AATTGTGAGC TTAACACTCG		TTCACACAGG AAGTGTGTCC		
4051	ACGCCAAGCG TGCGGTTCGC	CGCAATTAAC GCGTTAATTG	CCTCACTAAA GGAGTGATTT	GGGAACAAAA CCCTTGTTTT	GCTGGGTACC CGACCCATGG
		AvaI			
4101	GGGCCCCCC	TCGAGGTCAT			TCGGGATAGT AGCCCTATCA

FIG._40F

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Wallsby argetr 2 C C C Expression of Genes Encoding Cell Wall. SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 81 of 154

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4151		ACAAAGGTAA TGTTTCCATT			
4201		TATAAGTAAA ATATTCATTT		TAAAAGGTGG ATTTTCCACC	
4251		TTTCTACTAT AAAGATGATA		GAGGATGTTT CTCCTACAAA	
4301	TTGATACGTC AACTATGCAG	ATTTTTGTAT TAAAAACATA		TTAAGTTTAT AATTCAAATA	
4351	GAAATGCATA CTTTACGTAT	TCTGTATTTG AGACATAAAC		TAAGTTCGTT ATTCAAGCAA	
4401	ATACAGAGGG TATGTCTCCC	ATTTGTATAA TAAACATATT		TAAAAAACCC ATTTTTTGGG	
				EcoR	
4451	ТТСХСХТХХТ	TTTTGAGAAA	ААТАТАТАТТ	CAGGCGAATT	
4431		AAAACTCTTT		GTCCGCTTAA	
4501		ATTAAAATAG TAATTTTATC		TTGCAGCGAT AACGTCGCTA	
4551		TAAAAGATAA ATTTTCTATT	ACTTAGACTC TGAATCTGAG	AAAACATTTA TTTTGTAAAT	CAAAAACAAC GTTTTTGTTG
4601		CTAAAGCCCA GATTTCGGGT		CACGATCCAT GTGCTAGGTA	
4651		ACCCAACCCA TGGGTTGGGT		GTGCAGCCAA CACGTCGGTT	
4701		CCGGCACTAT GGCCGTGATA		TGTCCGCACC ACAGGCGTGG	
4751		AAAAAAAAAA TTTTTTTTT			
4801	AGGTGGGTCC TCCACCCAGG	GGGTCGTGGG CCCAGCACCC	GGCCGGAAAA CCGGCCTTTT	GCGAGGAGGA CGCTCCTCCT	TCGCGAGCAG AGCGCTCGTC
4851	CGACGAGGCC GCTGCTCCGG	CGGCCCTCCC GCCGGGAGGG	TCCGCTTCCA AGGCGAAGGT	AAGAAACGCC TTCTTTGCGG	CCCCATCGCC GGGGTAGCGG
4901		TACCCCCCC ATGGGGGGGG			
4951	CCACCACCAC GGTGGTGGTG	CACCTCCTCC GTGGAGGAGG			
5001	CCCTCCCCCT GGGAGGGGGA	CCGCCGCCGC	CGGTAACCAC GCCATTGGTG	CCCGCCCCTC GGGCGGGAG	TCCTCTTTCT AGGAGAAAGA



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5051	TTCTCCGTTT	TTTTTTCGT	CTCGGTCTCG	ATCTTTGGCC	TTGGTAGTTT	
	AAGAGGCAAA	AAAAAAAGCA	GAGCCAGAGC	TAGAAACCGG	AACCATCAAA	
E101	000000000	CACCCCCTTC	CECCCCAGA	TCGGTGCGCG	CCACCCCCC	
5101				AGCCACGCGC		
	CCC11CCCCC	01000000				
				Bar	nHI	
				~~~		
5151				TCGGCCCGGA		
	CTAGAGCGCC	GACCGCAGAG	GCCCGCACTC	AGCCGGGCCT	AGGAGCGCCC	
5201	GAATGGGGCT	CTCGGATGTA	GATCTTCTTT	CTTTCTTCTT	TTTGTGGTAG	
	CTTACCCCGA	GAGCCTACAT	CTAGAAGAAA	GAAAGAAGAA	AAACACCATC	
5251	AATTTGAATC	CCTCAGCATT	GTTCATCGGT	AGTTTTTCTT	TTCATGATTT	
	TTAAACTTAG	GGAGTCGTAA	CAAGTAGCCA	TCAAAAAGAA	AAGTACTAAA	
5301	GTGACAAATG	CAGCCTCGTG	CGGAGCTTTT	TTGTAGC		
	CACTGTTTAC	GTCGGAGCAC	GCCTCGAAAA	AACATCG		

FIG._40H

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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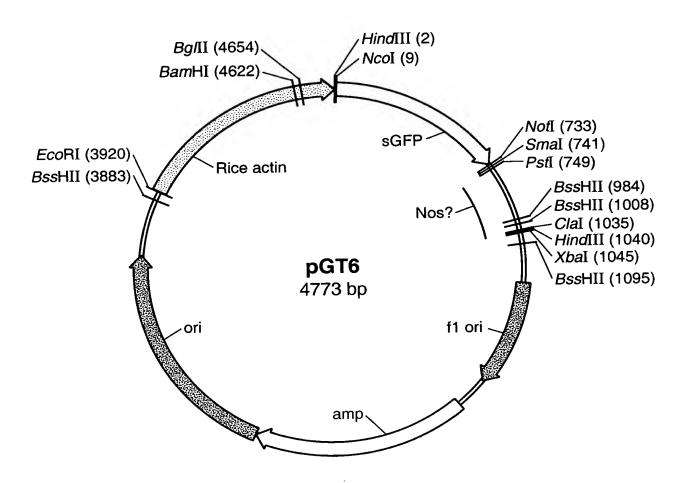


FIG._41A

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ਜ	AAGCTTACCA TGGTGAGCAA TTCGAATGGT ACCACTCGTT	TGGTGAGCAA	GGGCGAGGAG CCCGCTCCTC	CTGTTCACCG GACAAGTGGC	GGGTGGTGCC CCCACGG	CATCCTGGTC GTAGGACCAG	gagctggacg ctcgacctgc
71	GCGACGTGAA CGCTGCACTT	CGGCCACAAG GCCGGTGTTC	TTCAGCGTGT AAGTCGCACA	CCGGCGAGGG	CGAGGGCGAT GCTCCCGCTA	GCCACCTACG CGGTGGATGC	GCAAGCTGAC CGTTCGACTG
141	CCTGAAGTTC GGACTTCAAG	ATCTGCACCA TAGACGTGGT	CCGGCAAGCT GGCCGTTCGA	GCCCGTGCCC	TGGCCCACCC	<b>TCGTGACCAC</b> <b>AGCACTGGTG</b>	CTTCACCTAC GAAGTGGATG
211	GGCGTGCAGT	GCTTCAGCCG CGAAGTCGGC	CTACCCCGAC	CACATGAAGC GTGTACTTCG	AGCACGACTT TCGTGCTGAA	CTTCAAGTCC GAAGTTCAGG	GCCATGCCCG
281	AAGGCTACGT TTCCGATGCA	CCAGGAGCGC GGTCCTCGCG	ACCATCTTCT TGGTAGAAGA	TCAAGGACGA AGTTCCTGCT	CGGCAACTAC GCCGTTGATG	AAGACCCGCG TTCTGGGCGC	CCGAGGTGAA GGCTCCACTT
351	GTTCGAGGGC CAAGCTCCCG	GACACCCTGG CTGTGGGGACC	TGAACCGCAT ACTTGGCGTA	CGAGCTGAAG GCTCGACTTC	GGCATCGACT CCGTAGCTGA	TCAAGGAGGA AGTTCCTCCT	CGGCAACATC GCCGTTGTAG
421	CTGGGGCACA GACCCCGTGT	AGCTGGAGTA TCGACCTCAT	CAACTACAAC GTTGATGTTG	AGCCACAACG TCGGTGTTGC	TCTATATCAT AGATATAGTA	GGCCGACAAG CCGGCTGTTC	CAGAAGAACG GTCTTCTTGC
491	GCATCAAGGT CGTAGTTCCA	GAACTTCAAG CTTGAAGTTC	ATCCGCCACA TAGGCGGTGT	ACATCGAGGA TGTAGCTCCT	CGGCAGCGTG GCCGTCGCAC	CAGCTCGCCG GTCGAGCGGC	ACCACTACCA TGGTGATGGT
561	GCAGAACACC CGTCTTGTGG	CCCATCGGCG	ACGGCCCCGT	GCTGCTGCCC	GACAACCACT CTGTTGGTGA	ACCTGAGCAC TGGACTCGTG	CCAGTCCGCC GGTCAGGCGG
631	CTGAGCAAAG GACTCGTTTC	ACCCCAACGA TGGGGTTGCT	GAAGCGCGAT CTTCGCGCTA	CACATGGTCC GTGTACCAGG	TGCTGGAGTT ACGACCTCAA	CGTGACCGCC	GCCGGGATCA CGGCCCTAGT

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SmaI

NotI PstI

CACTGGCCGT CGTTTTACAA GCTTCTAGAG GCGGGATATC ACTCAGCATA ATGCGCGCGA GTGACCGGCA GCAAAATGTT TACATTTAAT ACGCGATAGA AAACAAAATA TAAATACTCT ACCCAAAAT ACTAATCTCA GGGCGTTAAT ATGTAAATTA TGCGCTATCT TTTGTTTTAT GATACAATGA TCTAGCTATT CGAAGATCTC AAGGATGAGC TTCCTACTCG GCCGGTCTTG TTTGTAAACC GTTATTTCAA AGAATTCTAA CTTAGGACAA CGGCCAGAAC GCATGACGTT TIGIACATIA CGIACIGCAA XbaI ClaI HindIII GAAACCACTG CTTTGGTGAC GAATCCTGTT TGTAATTA AACATGTAAT AGATCGATAA CGGCCGGTGG AGCTCCAATT CGCCCTATAG TGAGTCGTAT TACGCGCGT CCCGACGTCC TCTTAAGATT GACAACTTAA TGCAATTCGT ACATTATTAA CTATGTTACT GGGCTGCAGG BSSHII ATTTATGAGA TGGGTTTTTA TGATTAGAGT CCCGCAATTA ATTATCGCGC GCGGTGTCAT CAATAAAGTT ACGTTAAGCA TGATCCTATT TAATAGCGCG CGCCACAGTA 9990990090 ວວວອວວອອວອ BSSHII ATGTTCATTT AAACATTTGG CTGTTGAATT TACAAGTAAA GAGTGCCGTA CCTGCTCGAC ACATTTCTTC GTCTAGCAAG ACTAGGATAA GCCGGCCACC TCGAGGTTAA CAGATCGTTC CATATAATTT GTATATTAAA GGACGAGCTG ATCGCGCGTT TGTAAAGAAG CGATGATTAT GCTACTAATA TAGCGCGCAA CTCACGGCAT BSSHII 1051 701 771 841 911 981

# FIG._41C

GGCGTAATAG CGAAGAGGCC CGCACCGATC GCCCTTCCCA ACAGTTGCGC AGCCTGAATG GCGAATGGGA CCGCATTATC GCTTCTCCGG GCGTGGCTAG CGGGAAGGGT TGTCAACGCG TCGGACTTAC CGCTTACCCT

CCCTTTTGGG ACCGCAATGG GTTGAATTAG

TGGCGTTACC

GGGAAAACCC

CGTCGTGACT

1121

1191

CGGAACGTCG TGTAGGGGGA AAGCGGTCGA

ACATCCCCCT

GCCTTGCAGC

CAACTTAATC

TTCGCCAGCT

TACACTIGCC

CAATGCGCGT CGCACTGGCG ATGTGAACGG

GCGTGACCGC

GTTACGCGCA

CGCGCCCTGT AGCGGCGCAT TAAGCGCGGC GGGTGTGGTG

TCGCCGCGTA ATTCGCGCCG CCCACACCAC

GCGCGGGACA

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1331	AGCGCCCTAG TCGCGGGATC	CGCCCGCTCC	TTTCGCTTTC AAAGCGAAAG	TTCCCTTCCT	TTCTCGCCAC	GTTCGCCGGC	TTTCCCCGTC AAAGGGGCAG
1401	AAGCTCTAAA TTCGAGATTT	TCGGGGGCTC AGCCCCCGAG	CCTTTAGGGT GGAAATCCCA	TCCGATTTAG	TGCTTTACGG	CACCTCGACC	CCAAAAACT GGTTTTTGA
1471	TGATTAGGGT ACTAATCCCA	GATGGTTCAC CTACCAAGTG	GTAGTGGGCC CATCACCCGG	ATCGCCCTGA TAGCGGGACT	TAGACGGTTT ATCTGCCAAA	TTCGCCCTTT	GACGTTGGAG CTGCAACCTC
1541	TCCACGTTCT AGGTGCAAGA	TTAATAGTGG AATTATCACC	ACTCTTGTTC TGAGAACAAG	CAAACTGGAA GTTTGACCTT	CAACACTCAA GTTGTGAGTT	CCCTATCTCG GGGATAGAGC	GTCTATTCTT CAGATAAGAA
1611	TTGATTTATA AACTAAATAT	AGGGATTTTG TCCCTAAAAC	CCGATTTCGG GGCTAAAGCC	CCTATTGGTT GGATAACCAA	AAAAAATGAG TTTTTACTC	CTGATTTAAC GACTAAATTG	AAAATTTAA TTTTTAAATT
1681	CGCGAATTTT GCGCTTAAAA	AACAAAATAT TTGTTTTATA	TAACGCTTAC ATTGCGAATG	AATTTAGGTG TTAAATCCAC	GCACTTTTCG CGTGAAAAGC	GGGAAATGTG CCCTTTACAC	CGCGGAACCC GCGCCTTGGG
1751	CTATTTGTTT GATAAACAAA	ATTTTCTAA TAAAAAGATT	ATACATTCAA TATGTAAGTT	ATATGTATCC TATACATAGG	GCTCATGAGA CGAGTACTCT	CAATAACCCT GTTATTGGGA	GATAAATGCT CTATTTACGA
1821	TCAATAATAT AGTTATTATA	TGAAAAAGGA ACTTTTTCCT	AGAGTATGAG TCTCATACTC	TATTCAACAT ATAAGTTGTA	TTCCGTGTCG AAGGCACAGC	CCCTTATTCC GGGAATAAGG	CTTTTTGCG G <b>AAAAA</b> CGC
1891	GCATTTTGCC CGTAAAACGG	TTCCTGTTTT AAGGACAAAA	TGCTCACCCA	GAAACGCTGG CTTTGCGACC	TGAAAGTAAA ACTTTCATTT	AGATGCTGAA TCTACGACTT	GATCAGTTGG CTAGTCAACC
1961	GTGCACGAGT CACGTGCTCA	GGGTTACATC	GAACTGGATC CTTGACCTAG	TCAACAGCGG AGTTGTCGCC	TAAGATCCTT ATTCTAGGAA	GAGAGTTTTC CTCTCAAAAG	GCCCCGAAGA CGGGGCTTCT
2031	ACGTTTTCCA TGCAAAAGGT	ATGATGAGCA	CTTTTAAAGT GAAAATTTCA	TCTGCTATGT AGACGATACA	GGCGCGGTAT	TATCCCGTAT ATAGGGCATA	TGACGCCGGG ACTGCGGCCC
2101	CAAGAGCAAC	TCGGTCGCCG	CATACACTAT GTATGTGATA	TCTCAGAATG AGAGTCTTAC	ACTTGGTTGA TGAACCAACT	GTACTCACCA CATGAGTGGT	GTCACAGAAA CAGTGTCTTT

## F/G._41D

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls Target Targe

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2171	AGCATCTTAC	GGATGGCATG	ACAGTAAGAG	AATTATGCAG	TGCTGCCATA	ACCATGAGTG	ATAACACTGC
	TCGTAGAATG	CCTACCGTAC	TGTCATTCTC	TTAATACGTC	ACGACGGTAT	TGGTACTCAC	TATTGTGACG
2241	GGCCAACTTA	CTTCTGACAA	CGATCGGAGG	ACCGAAGGAG	CTAACCGCTT	TTTTGCACAA	CATGGGGGAT
	CCGGTTGAAT	GAAGACTGTT	GCTAGCCTCC	TGGCTTCCTC	GATTGGCGAA	AAAACGTGTT	GTACCCCCTA
2311	CATGTAACTC	GCCTTGATCG	TTGGGAACCG	GAGCTGAATG	AAGCCATACC	AAACGACGAG	CGTGACACCA
	GTACATTGAG	CGGAACTAGC	AACCCTTGGC	CTCGACTTAC	TTCGGTATGG	TTTGCTGCTC	GCACTGTGGT
2381	CGATGCCTGT GCTACGGACA	AGCAATGGCA TCGTTACCGT	ACAACGTTGC TGTTGCAACG	GCAAACTATT CGTTTGATAA	AACTGGCGAA TTGACCGCTT	CTACTTACTC GATGAATGAG	TAGCTTCCCG
2451	GCAACAATTA	ATAGACTGGA	TGGAGGCGGA	TAAAGTTGCA	GGACCACTTC	TGCGCTCGGC	CCTTCCGGCT
	CGTTGTTAAT	TATCTGACCT	ACCTCCGCCT	ATTTCAACGT	CCTGGTGAAG	ACGCGAGCCG	GGAAGGCCGA
2521	GGCTGGTTTA	TTGCTGATAA	ATCTGGAGCC	GGTGAGCGTG	GGTCTCGCGG	TATCATTGCA	GCACTGGGGC
	CCGACCAAAT	AACGACTATT	TAGACCTCGG	CCACTCGCAC	CCAGAGCGCC	ATAGTAACGT	CGTGACCCCG
2591	CAGATGGTAA	GCCCTCCCGT	ATCGTAGTTA	TCTACACGAC	GGGGAGTCAG	GCAACTATGG	ATGAACGAAA
	GTCTACCATT	CGGGAGGGCA	TAGCATCAAT	AGATGTGCTG	CCCCTCAGTC	CGTTGATACC	TACTTGCTTT
2661	TAGACAGATC	GCTGAGATAG	GTGCCTCACT	GATTAAGCAT	TGGTAACTGT	CAGACCAAGT	TTACTCATAT
	ATCTGTCTAG	CGACTCTATC	CACGGAGTGA	CTAATTCGTA	ACCATTGACA	GTCTGGTTCA	AATGAGTATA
2731	ATACTTTAGA	TTGATTTAAA	ACTTCATTTT	TAATTTAAAA	GGATCTAGGT	GAAGATCCTT	TTTGATAATC
	TATGAAATCT	AACTAAATTT	TGAAGTAAAA	ATTAAATTTT	CCTAGATCCA	CTTCTAGGAA	AAACTATTAG
2801	TCATGACCAA	AATCCCTTAA	CGTGAGTTTT	CGTTCCACTG	AGCGTCAGAC	CCCGTAGAAA	<b>AGATCAAAGG</b>
	AGTACTGGTT	TTAGGGAATT	GCACTCAAAA	GCAAGGTGAC	TCGCAGTCTG	GGGCATCTTT	TCTAGTTTCC
2871	ATCTTCTTGA	GATCCTTTTT	TTCTGCGCGT	AATCTGCTGC	TTGCAAACAA	AAAAACCACC	GCTACCAGCG
	TAGAAGAACT	CTAGGAAAAA	AAGACGCGCA	TTAGACGACG	AACGTTTGTT	TTTTTGGTGG	CGATGGTCGC
2941	GTGGTTTGTT	TGCCGGATCA	AGAGCTACCA	ACTCTTTTTC	CGAAGGTAAC	TGGCTTCAGC	AGAGCGCAGA
	CACCAAACAA	ACGGCCTAGT	TCTCGATGGT	TGAGAAAAAG	GCTTCCATTG	ACCGAAGTCG	TCTCGCGTCT

## 7/G._41E

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Talgeted Expression of Genes Encoding Cell Wall..."

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3011	TACCAAATAC	TGTCCTTCTA	GTGTAGCCGT	AGTTAGGCCA	CCACTTCAAG	AACTCTGTAG	CACCGCCTAC
	ATGGTTTATG	ACAGGAAGAT	CACATCGGCA	TCAATCCGGT	GGTGAAGTTC	TTGAGACATC	GTGGCGGATG
3081	ATACCTCGCT TATGGAGCGA	CTGCTAATCC GACGATTAGG	TGTTACCAGT ACAATGGTCA	GGCTGCTGCC	AGTGGCGATA TCACCGCTAT	AGTCGTGTCT TCAGCACAGA	TACCGGGTTG ATGGCCCAAC
3151	GACTCAAGAC	GATAGTTACC	GGATAAGGCG	CAGCGGTCGG	GCTGAACGGG	GGGTTCGTGC	ACACAGCCCA
	CTGAGTTCTG	CTATCAATGG	CCTATTCCGC	GTCGCCAGCC	CGACTTGCCC	CCCAAGCACG	TGTGTCGGGT
3221	GCTTGGAGCG	AACGACCTAC	ACCGAACTGA	GATACCTACA	GCGTGAGCTA	TGAGAAAGCG	CCACGCTTCC
	CGAACCTCGC	TTGCTGGATG	TGGCTTGACT	CTATGGATGT	CGCACTCGAT	ACTCTTTCGC	GGTGCGAAGG
3291	CGAAGGGAGA	AAGGCGGACA	GGTATCCGGT	AAGCGGCAGG	GTCGGAACAG	GAGAGCGCAC	GAGGGAGCTT
	GCTTCCCTCT	TTCCGCCTGT	CCATAGGCCA	TTCGCCGTCC	CAGCCTTGTC	CTCTCGCGTG	CTCCCTCGAA
3361	CCAGGGGGAA	ACGCCTGGTA	TCTTTATAGT	CCTGTCGGGT	TTCGCCACCT	CTGACTTGAG	CGTCGATTTT
	GGTCCCCCTT	TGCGGACCAT	AGAAATATCA	GGACAGCCCA	AAGCGGTGGA	GACTGAACTC	GCAGCTAAAA
3431	TGTGATGCTC ACACTACGAG	GTCAGGGGGG	CGGAGCCTAT GCCTCGGATA	GGAAAAACGC CCTTTTTGCG	CAGCAACGCG GTCGTTGCGC	GCCTTTTTAC CGGAAAAATG	GGTTCCTGGC CCAAGGACCG
3501	CTTTTGCTGG	CCTTTTGCTC	ACATGTTCTT	TCCTGCGTTA	TCCCCTGATT	CTGTGGATAA	CCGTATTACC
	GAAAACGACC	GGAAAACGAG	TGTACAAGAA	AGGACGCAAT	AGGGGACTAA	GACACCTATT	GGCATAATGG
3571	GCCTTTGAGT CGGAAACTCA	GAGCTGATAC CTCGACTATG	CGCTCGCCGC	AGCCGAACGA TCGGCTTGCT	CCGAGCGCAG	CGAGTCAGTG	AGCGAGGAAG TCGCTCCTTC
3641	CGGAAGAGCG GCCTTCTCGC	CCCAATACGC GGGTTATGCG	AAACCGCCTC TTTGGCGGAG	TCCCCGCGCG	TTGGCCGATT AACCGGCTAA	CATTAATGCA GTAATTACGT	GCTGGCACGA
3711	CAGGTTTCCC	GACTGGAAAG	CGGGCAGTGA	GCGCAACGCA	ATTAATGTGA	GTTAGCTCAC	TCATTAGGCA
	GTCCAAAGGG	CTGACCTTTC	GCCCGTCACT	CGCGTTGCGT	TAATTACACT	CAATCGAGTG	AGTAATCCGT
3781	CCCCAGGCTT GGGGTCCGAA	TACACTTTAT ATGTGAAATA	GCTTCCGGCT	CGTATGTTGT GCATACAACA	GTGGAATTGT CACCTTAACA	GAGCGGATAA CTCGCCTATT	CAATTTCACA GTTAAAGTGT

## FIG._41F

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted Expression of Genes Encoding Cell Wall..."

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				BssHII			ECORI
3851	CAGGAAACAG GTCCTTTGTC	CTATGACCAT GATACTGGTA	GATTACGCCA CTAATGCGGT	AGCGCGCAAT TCGCGCGTTA	TAACCCTCAC ATTGGGAGTG	TAAAGGGAAC ATTTCCCTTG	AAAAGCTGGA TTTTCGACCT
3921	ECORI ~~~~ ATTCCACAAT TAAGGTGTTA	GAACAATAAT CTTGTTATTA	AAGATTAAAA TTCTAATTTT	TAGCTTGCCC ATCGAACGGG	CCGTTGCAGC	GATGGGTATT CTACCCATAA	TTTTCTAGTA AAAAGATCAT
3991	AAATAAAAGA TTTATTTTCT	TAAACTTAGA ATTTGAATCT	CTCAAAACAT GAGTTTTGTA	TTACAAAAAC AATGTTTTTG	AACCCCTAAA TTGGGGATTT	GTCCTAAAGC CAGGATTTCG	CCAAAGTGCT GGTTTCACGA
4061	ATGCACGATC TACGTGCTAG	CATAGCAAGC GTATCGTTCG	CCAGCCCAAC GGTCGGGTTG	CCAACCCAAC GGTTGGGTTG	CCAACCCACC GGTTGGGTGG	CCAGTGCAGC GGTCACGTCG	CAACTGGCAA GTTGACCGTT
4131	ATAGTCTCCA TATCAGAGGT	CCCCGGCAC	TATCACCGTG ATAGTGGCAC	AGTTGTCCGC TCAACAGGCG	ACCACCGCAC TGGTGGCGTG	GTCTCGCAGC CAGAGCGTCG	CAAAAAAAA GTTTTTTTT
4201	AAAAGAAAGA TTTTCTTTCT	AAAAAAAGAA TTTTTTCTT	AAAGAAAAAC TTTCTTTTTG	AGCAGGTGGG TCGTCCACCC	TCCGGGTCGT AGGCCCAGCA	GGGGGCCGGA	AAAGCGAGGA TTTCGCTCCT
4271	GGATCGCGAG CCTAGCGCTC	CAGCGACGAG GTCGCTGCTC	GCCCGGCCCT	CCCTCCGCTT	CCAAAGAAAC GGTTTCTTTG	GCCCCCCATC	GCCACTATAT CGGTGATATA
4341	ACATACCCCC TGTATGGGGG	CCCTCTCCTC	CCATCCCCCC	AACCCTACCA TTGGGATGGT	CCACCACCAC	CACCACCTCC GTGGTGGAGG	TCCCCCTCG AGGGGGGAGC
4411	CTGCCGGACG	ACGAGCTCCT TGCTCGAGGA	CCCCCTCCC	CCTCCGCCGC	CGCCGGTAAC GCGGCCATTG	CACCCGCCC	CTCTCCTCTT GAGAGGAGAA
4481	TCTTTCTCCG AGAAAGAGGC	TTTTTTTT AAAAAAAAA	CGTCTCGGTC GCAGAGCCAG	TCGATCTTTG AGCTAGAAAC	GCCTTGGTAG CGGAACCATC	TTTGGGTGGG AAACCCACCC	CGAGAGCGGC GCTCTCGCCG
4551	TTCGTCGCCC AAGCAGCGGG	AGATCGGTGC TCTAGCCACG	GCGGGAGGGG	CGGGATCTCG GCCCTAGAGC	CGGCTGGCGT	CTCCGGGCGT	GAGTCGGCCC CTCAGCCGGG

## FIG._41G

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Tangeted Expression of Genes Encoding Cell Wall..."
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	BamHI			Bglii				
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			1 1 1 1 1 1				
4621	GGATCCTCGC		GGGGAATGGG GCTCTCGGAT GTAGATCTTC TTTCTTTCTT CTTTTTGG TAGAATTTGA	GTAGATCTTC	TTTCTTTCTT	CTTTTTGTGG	TAGAATTTGA	
	CCTAGGAGCG		CCCCTIACCC CGAGAGCCIA CAICTAGAAG AAAGAAAGAA GAAAAACC AICTIAAACI	CATCTAGAAG	AAAGAAAGAA	GAAAACACC	ATCITAGACI	
4691	ATCCCTCAGC		ATTGTTCATC GGTAGTTTTT CTTTTCATGA TTTGTGACAA ATGCAGCCTC GTGCGGAGCT	CTTTTCATGA	TTTGTGACAA	ATGCAGCCTC	GTGCGGAGCT	
	TAGGGAGTCG	TAACAAGTAG	TAACAAGTAG CCATCAAAA GAAAAGTACT AAACACTGTT TACGTCGGAG CACGCCTCGA	GAAAAGTACT	AAACACTGTT	TACGTCGGAG	CACGCCTCGA	
4761	TTTTTGTAGG	TAG						
	AAAAACATCC ATC	ATC						

# FIG._41H

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Cargard Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 91 of 154

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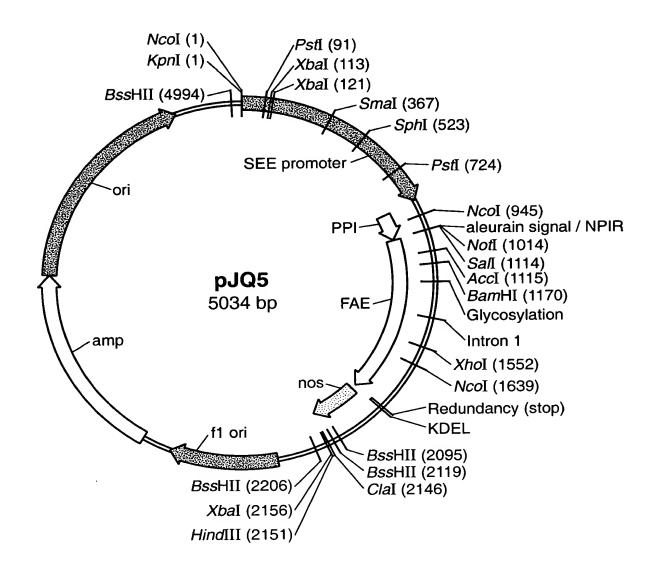


FIG._42A

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н	CATGGGCCAG GTACCCGGTC	GTATAATTAT CATATTAATA	GGGATATCTC CCCTATAGAG	AAGCAAATAA TTCGTTTATT	TCGAAATATC AGCTTTATAG	ACCATTGGCT TGGTAACCGA	ACAATATCTG TGTTATAGAC	
		PstI	į		XbaI	XbaI		
71	AGCTCCGAGT TCGAGGCTCA	AGCTCCGAGT TCTGACTGCA TCGAGGCTCA AGACTGACGT	GTCTGGATGA	CGCGTGTTGT GCGCACAACA	ACT	CTAGATAGCA GATCTATCGT	CAGCCACAGC GTCGGTGTCG	
141	ACCTACAGGA TGGATGTCCT	GTGCGACACT CACGCTGTGA	TGTGGACTGT ACACCTGACA	AGTAGTGTTG TCATCACAAC	GAGACGGAGC CTCTGCCTCG	TCTTTCCTAC AGAAAGGATG	CTCCTGACGT GAGGACTGCA	
211	TGCCGCCGTT ACGGCGGCAA	TGCCGCCGTT GTCCATTCCA ACGGCGCCAA CAGGTAAGGT	ACGGCATCAC TGCCGTAGTG	TCTCAACCAA AGAGTTGGTT	TCACGCGCTC AGTGCGCGAG	CCAACAAAT GGTTGTTTTA	ATCGTCCCCC TAGCAGGGGG	
281	ATGTCTTGGC TACAGAACCG	ATGTCTTGGC GGAGAGAGAG TACAGAACCG CCTCTCTCTC	TACATACATG ATGTATGTAC	CTGTCGCGCC	GTTTTTGTCT CAAAAACAGA	GAATCTCGCT CTTAGAGCGA	TCCACTGGCC AGGTGACCGG	
351	AATCAGCTCA GC! TTAGTCGAGT CG	Smal cccccggga cgagggcccr	GCTCACTCAT CGAGTGAGTA	TCAAGATCCC AGTTCTAGGG	ATCGTCGTCG TAGCAGCAGC	TCACCCCTGG AGTGGGGACC	CGTCATGGGA GCAGTACCCT	
421	TGGAAAAGAA ACCTTTTCTT	TGGAAAAGAA CCTCCGTTGC ACCTTTTCTT GGAGGCAACG	TCGGATGAGT AGCCTACTCA	CAGCCATATC GTCGGTATAG	CCCGAACAGA GGGCTTGTCT	GTACTGCAAG CATGACGTTC	ATAACCCAAT TATTGGGTTA	
			Idgs	H				
491	TCAGATTCCC AGTCTAAGGG	TCAGATTCCC CCAATAGAGA AGTCTAAGGG GGTTATCTCT	AAGTATA( TTCATAT	TGCTTTCGGG	TTTTGTTTGG AAAACAAACC	CTTAATTGAC GAATTAACTG	TTTATTTTG AAATAAAAAC	
561	TTGGAGTTGA AACCTCAACT	TTGGAGTTGA ATGCTGATTT AACCTCAACT TACGACTAAA	GTTGTGTAAA CAACACATTT	ATGCCCAACC TACGGGTTGG	ATCTGAATAT TAGACTTATA	CGAGACGGAT GCTCTGCCTA	AATAGGCTGG TTATCCGACC	

Ncol ~~~~~ Kpni ~

### FIG._42E

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631	CTAATTAATT GATTAATTAA	TATAGCAAGA ATATCGTTCT	TTCTGTAGTG AAGACATCAC	CACATCGCAA GTGTAGCGTT	ATATCTTTCT TATAGAAAGA	GGGCATTACA CCCGTAATGT	GCTGGAGGCT CGACCTCCGA
701	TCATCAGCCT AGTAGTCGGA	G G	PstI AACACTCT GCAGAGCCTG	AAGCAAGTGG TTCGTTCACC	TGAAGCGTGG ACTTCGCACC	CGATGAGATG GCTACTCTAC	<b>GGTATAAAA</b> C CCATATTTTG
771		GGGACGCGAG CCCTGCGCTC	CTCCCGCCTA	CCAGTACCAT GGTCATGGTA	CTCGCCTCGC	TCCCCCTGCC AGGGGGACGG	GGACGACCCA CCTGCTGGGT
841	GTAAAATACT CATTTTATGA	GTTGCCCACT CAACGGGTGA	CGCCGGCGAG	ATGGMCGTGC TACCKGCACG	ACAAGGAGGT TGTTCCTCCA	SAACTTCGTS STTGAAGCAS	GCCTACCTCC CGGATGGAGG
911	TGATCGTSCT ACTAGCASGA	CGGCCTCCTC	TTGCTCGTST AACGAGCASA	NCOI ~~~~~~ CCGCCATGGA GGCGGTACCT	GCACGTGGAC	GCCAAGGCCT CGGTTCCGGA	GCACCCKCGA CGTGGGMGCT
981	GTGCGGCAAC	CTCGGCTTCG	GCATCTGCCC CGTAGACGGG	Noti GGCGGCCGCC CCGCCGCGG	TCCACGCAGG	GCATCTCCGA CGTAGAGGCT	AGACCTCTAC TCTGGAGATG
1051	AGCCGTTTAG TCGGCAAATC	TCGAAATGGC	CACTATCTCC GTGATAGAGG	CAAGCTGCCT	ACGCCGACCT TGCGGCTGGA	GTGCAACATT CACGTTGTAA	Sali Acci CCGTCGACTA GGCAGCTGAT
					Ä	BamHI	

## FIG._42C

TTATCAAGGG AGAGAAATT TACAATTCTC AAACTGACAT TAACGGATGG ATCCTCCGCG ACGACAGCAG

TCTCTTTTAA ATGTTAAGAG TTTGACTGTA ATTGCCTACC TAGGAGGCGC TGCTGTCGTC

AATAGTTCCC

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1191	CAAAGAAATA GTTTCTTTAT	ATCACCGTCT TAGTGGCAGA	TCCGTGGCAC AGGCACCGTG	TGGTAGTGAT ACCATCACTA	ACGAATCTAC TGCTTAGATG	AACTCGATAC TTGAGCTATG	TAACTACACC ATTGATGTGG
1261	CTCACGCCTT GAGTGCGGAA	TCGACACCCT AGCTGTGGGA	ACCACAATGC TGGTGTTACG	AACGGTTGTG TTGCCAACAC	AAGTACACGG TTCATGTGCC	TGGATATTAT ACCTATAATA	ATTGGATGGG TAACCTACCC
1331	TCTCCGTCCA AGAGGCAGGT	GGACCAAGTC CCTGGTTCAG	GAGTCGCTTG CTCAGCGAAC	TCAAACAGCA AGTTTGTCGT	GGTTAGCCAG CCAATCGGTC	TATCCGGACT ATAGGCCTGA	ACGCGCTGAC TGCGCGACTG
1401	CGTGACCGGC	CACKCCCTCG GTGMGGGAGC	GCGCCTCCCT	GGCGGCACTC CCGCCGTGAG	ACTGCCGCCC TGACGGCGGG	AGCTGTCTGC TCGACAGACG	GACATACGAC CTGTATGCTG
1471	AACATCCGCC TG TTGTAGGCGG AC	TGTACACCTT ACATGTGGAA	CGGCGAACCG GCCGCTTGGC	CGCAGCGGCA	ATCAGGCCTT TAGTCCGGAA	CGCGTCGTAC GCGCAGCATG	ATGAACGATG TACTTGCTAC
1541	CCTTCCAAGC GGAAGGTTCG	XhoI CTCGAGCCCA GAGCTCGGGT	GATACGACGC CTATGCTGCG	AGTATTTCCG TCATAAAGGC	GGTCACTCAT CCAGTGAGTA	GCCAACGACG CGGTTGCTGC	GCATCCCAAA CGTAGGGTTT
1611	CCTGCCCCG	GTGGAGCAGG CACCTCGTCC	Ncol GGTACGCCCA T CCATGCGGGT A	)I TGGCGGTGTA ACCGCCACAT	GAGTACTGGA CTCATGACCT	GCGTTGATCC CGCAACTAGG	TTACAGCGCC AATGTCGCGG
1681	CAGAACACAT GTCTTGTGTA	TTGTCTGCAC AACAGACGTG	TGGGGATGAA ACCCCTACTT	GTGCAGTGCT	GTGAGGCCCA	GGGCGGACAG CCCGCCTGTC	GGTGTGAATA CCACACTTAT
1751	ATGCGCACAC TACGCGTGTG	GACTTATTTT CTGAATAAAA	GGGATGACGA CCCTACTGCT	GCGGAGCCTG CGCCTCGGAC	TACATGGTGA ATGTACCACT	TCAGTCATTT AGTCAGTAAA	CAGCCTCCCC GTCGGAGGGG
1821	GAGTGTACCA CTCACATGGT	GGAAAGATGG CCTTTCTACC	ATGTCCTGGA TACAGGACCT	GAGGGGGCCG	CGTAACCACT	GAAGGATGAG CTTCCTACTC	CTGTAAAGAA GACATTTCTT

## FIG._ 42D

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeton Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 95 of 154

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1891	GCAGATCGTT CGTCTAGCAA	CAAACATTTG GTTTGTAAAC	GCAATAAAGT CGTTATTTCA	TTCTTAAGAT AAGAATTCTA	TGAATCCTGT ACTTAGGACA	TGCCGGTCTT ACGGCCAGAA	GCGATGATTA CGCTACTAAT
1961	TCATATAATT AGTATATTAA	TCTGTTGAAT AGACAACTTA	TACGTTAAGC ATGCAATTCG	ATGTAATAAT TACATTATTA	TAACATGTAA ATTGTACATT	TGCATGACGT ACGTACTGCA	<b>TATTTATGAG</b> <b>ATAAATA</b> CTC
2031	ATGGGTTTTT TACCCAAAAA	ATGATTAGAG TACTAATCTC	TCCCGCAATT AGGGCGTTAA	ATACATTTAA TATGTAAATT	TACGCGATAG ATGCGCTATC	AAAACAAAAT TTTTGTTTTA	BSSHII ~~~~~ ATAGCGCGCA TATCGCGCGT
						XbaI	
2101	AACTAGGATA TTGATCCTAT	AATTATC	BSSHII CCG CGCGGTGTCA CGC GCGCCACAGT	TCTATGTTAC AGATACAATG	Clai Hindili TAGATCGATA AGCTT ATCTAGCTAT TCGAA	LndIII ACCTCTAGA TCGAAGATCT	GCGGCCGGTG
2171	GAGCTCCAAT CTCGAGGTTA	TCGCCCTATA AGCGGGATAT	GTGAGTCGTA CACTCAGCAT	BSSHII ~~~~~ TTACGCGCGC	TCACTGGCCG	TCGTTTTACA AGCAAAATGT	ACGTCGTGAC TGCAGCACTG
2241	TGGGAAAACC ACCCTTTTGG	CTGGCGTTAC GACCGCAATG	CCAACTTAAT GGTTGAATTA	CGCCTTGCAG GCGGAACGTC	CACATCCCCC GTGTAGGGGG	TTTCGCCAGC AAAGCGGTCG	TGGCGTAATA ACCGCATTAT
2311	GCGAAGAGGC CGCTTCTCCG	CCGCACCGAT GGCGTGGCTA	CGCCCTTCCC GCGGGAAGGG	AACAGTTGCG TTGTCAACGC	CAGCCTGAAT GTCGGACTTA	GGCGAATGGG CCGCTTACCC	ACGCGCCCTG TGCGCGGGAC
2381	TAGCGGCGCA	TTAAGCGCGG AATTCGCGCC	CGGGTGTGGT	GGTTACGCGC CCAATGCGCG	AGCGTGACCG TCGCACTGGC	CTACACTTGC GATGTGAACG	CAGCGCCCTA GTCGCGGGAT
2451	GCGCCCGCTC	CTTTCGCTTT GAAAGCGAAA	CTTCCCTTCC GAAGGGAAGG	TTTCTCGCCA AAAGAGCGGT	CGTTCGCCGG	CTTTCCCCGT GAAAGGGGCA	CAAGCTCTAA GTTCGAGATT

## FIG._42E

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by fargeted Expression of Genes Encoding Cell Wall. SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 96 of 154

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2521	ATCGGGGGCT	CCCTTTAGGG GGGAAATCCC	TTCCGATTTA AAGGCTAAAT	GTGCTTTACG CACGAAATGC	GCACCTCGAC	CCCAAAAAAC GGGTTTTTTG	TTGATTAGGG AACTAATCCC
2591	TGATGGTTCA	CGTAGTGGGC	CATCGCCCTG	ATAGACGGTT	TTTCGCCCTT	TGACGTTGGA	GTCCACGTTC
	ACTACCAAGT	GCATCACCCG	GTAGCGGGAC	TATCTGCCAA	AAAGCGGGAA	ACTGCAACCT	CAGGTGCAAG
2661	TTTAATAGTG	GACTCTTGTT	CCAAACTGGA	ACAACACTCA	ACCCTATCTC	GGTCTATTCT	TTTGATTTAT
	AAATTATCAC	CTGAGAACAA	GGTTTGACCT	TGTTGTGAGT	TGGGATAGAG	CCAGATAAGA	AAACTAAATA
2731	AAGGGATTTT	GCCGATTTCG	GCCTATTGGT	TAAAAAATGA	GCTGATTTAA	CAAAAATTTA	ACGCGAATTT
	TTCCCTAAAA	CGGCTAAAGC	CGGATAACCA	ATTTTTTACT	CGACTAAATT	GTTTTTAAAT	TGCGCTTAAA
2801	TAACAAAATA	TTAACGCTTA	CAATTTAGGT	GGCACTTTTC	GGGGAAATGT	GCGCGGAACC	CCTATTTGTT
	ATTGTTTTAT	AATTGCGAAT	GTTAAATCCA	CCGTGAAAAG	CCCCTTTACA	CGCGCCTTGG	GGATAAACAA
2871	TATTTTCTA	AATACATTCA	AATATGTATC	CGCTCATGAG	ACAATAACCC	TGATAAATGC	TTCAATAATA
	ATAAAAGAT	TTATGTAAGT	TTATACATAG	GCGAGTACTC	TGTTATTGGG	ACTATTTACG	AAGTTATTAT
2941	TTGAAAAAGG	AAGAGTATGA	GTATTCAACA	TTTCCGTGTC	GCCCTTATTC	CCTTTTTTGC	GGCATTTTGC
	AACTTTTTCC	TTCTCATACT	CATAAGTTGT	AAAGGCACAG	CGGGAATAAG	GGAAAAAACG	CCGTAAAACG
3011	CTTCCTGTTT	TTGCTCACCC	AGAAACGCTG	GTGAAAGTAA	AAGATGCTGA	AGATCAGTTG	GGTGCACGAG
	GAAGGACAAA	AACGAGTGGG	TCTTTGCGAC	CACTTTCATT	TTCTACGACT	TCTAGTCAAC	CCACGTGCTC
3081	TGGGTTACAT	CGAACTGGAT	CTCAACAGCG	GTAAGATCCT	TGAGAGTTTT	CGCCCCGAAG	aacgttttcc
	ACCCAATGTA	GCTTGACCTA	GAGTTGTCGC	CATTCTAGGA	ACTCTCAAAA	GCGGGGCTTC	ttgcaaaagg
3151	AATGATGAGC TTACTACTCG	ACTTTTAAAG TGAAAATTTC	TTCTGCTATG AAGACGATAC	TGGCGCGGTA	TTATCCCGTA AATAGGGCAT	TTGACGCCGG AACTGCGGCC	GCAAGAGCAA CGTTCTCGTT
3221	CTCGGTCGCC	GCATACACTA	TTCTCAGAAT	GACTTGGTTG	AGTACTCACC	AGTCACAGAA	AAGCATCTTA
	GAGCCAGCGG	CGTATGTGAT	AAGAGTCTTA	CTGAACCAAC	TCATGAGTGG	TCAGTGTCTT	TTCGTAGAAT
3291	CGGATGGCAT	gacagtaaga Ctgtcattct	GAATTATGCA CTTAATACGT	GTGCTGCCAT CACGACGGTA	AACCATGAGT TTGGTACTCA	GATAACACTG CTATTGTGAC	CGGCCAACTT GCCGGTTGAA

### FIG._42F

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by arget Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 97 of 154

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3361	ACTTCTGACA TGAAGACTGT	ACGATCGGAG TGCTAGCCTC	GACCGAAGGA	GCTAACCGCT CGATTGGCGA	TTTTTGCACA AAAAACGTGT	ACATGGGGGA TGTACCCCCT	TCATGTAACT AGTACATTGA
3431	CGCCTTGATC	GTTGGGAACC	GGAGCTGAAT	GAAGCCATAC	CAAACGACGA	GCGTGACACC	ACGATGCCTG
	GCGGAACTAG	CAACCCTTGG	CCTCGACTTA	CTTCGGTATG	GTTTGCTGCT	CGCACTGTGG	TGCTACGGAC
3501	TAGCAATGGC	AACAACGTTG	CGCAAACTAT	TAACTGGCGA	ACTACTTACT	CTAGCTTCCC	GGCAACAATT
	ATCGTTACCG	TTGTTGCAAC	GCGTTTGATA	ATTGACCGCT	TGATGAATGA	GATCGAAGGG	CCGTTGTTAA
3571	AATAGACTGG TTATCTGACC	ATGGAGGCGG TACCTCCGCC	ATAAAGTTGC TATTTCAACG	AGGACCACTT TCCTGGTGAA	CTGCGCTCGG	CCCTTCCGGC	TGGCTGGTTT ACCGACCAAA
3641	ATTGCTGATA	AATCTGGAGC	CGGTGAGCGT	GGGTCTCGCG	GTATCATTGC	AGCACTGGGG	CCAGATGGTA
	TAACGACTAT	TTAGACCTCG	GCCACTCGCA	CCCAGAGCGC	CATAGTAACG	TCGTGACCCC	GGTCTACCAT
3711	AGCCCTCCCG	TATCGTAGTT	ATCTACACGA	CGGGGAGTCA	GGCAACTATG	GATGAACGAA	ATAGACAGAT
	TCGGGAGGGC	ATAGCATCAA	TAGATGTGCT	GCCCCTCAGT	CCGTTGATAC	CTACTTGCTT	TATCTGTCTA
3781	CGCTGAGATA GCGACTCTAT	GGTGCCTCAC	TGATTAAGCA ACTAATTCGT	TTGGTAACTG AACCATTGAC	TCAGACCAAG AGTCTGGTTC	TTTACTCATA AAATGAGTAT	TATACTTTAG ATATGAAATC
3851	ATTGATTTAA	AACTTCATTT	TTAATTTAAA	AGGATCTAGG	TGAAGATCCT	TTTTGATAAT	CTCATGACCA
	TAACTAAATT	TTGAAGTAAA	AATTAAATTT	TCCTAGATCC	ACTTCTAGGA	AAAACTATTA	GAGTACTGGT
3921	AAATCCCTTA	ACGTGAGTTT	TCGTTCCACT	GAGCGTCAGA	CCCCGTAGAA	AAGATCAAAG	GATCTTCTTG
	TTTAGGGAAT	TGCACTCAAA	AGCAAGGTGA	CTCGCAGTCT	GGGGCATCTT	TTCTAGTTTC	CTAGAAGAAC
3991	AGATCCTTTT	TTTCTGCGCG	TAATCTGCTG	CTTGCAAACA	AAAAAACCAC	CGCTACCAGC	GGTGGTTTGT
	TCTAGGAAAA	AAAGACGCGC	ATTAGACGAC	GAACGTTTGT	TTTTTTGGTG	GCGATGGTCG	CCACCAAACA
4061	TTGCCGGATC	AAGAGCTACC	AACTCTTTTT	CCGAAGGTAA	CTGGCTTCAG	CAGAGCGCAG	ATACCAAATA
	AACGGCCTAG	TTCTCGATGG	TTGAGAAAAA	GGCTTCCATT	GACCGAAGTC	GTCTCGCGTC	TATGGTTTAT
4131	CTGTCCTTCT GACAGGAAGA	AGTGTAGCCG TCACATCGGC	TAGTTAGGCC	ACCACTTCAA TGGTGAAGTT	GAACTCTGTA CTTGAGACAT	GCACCGCCTA CGTGGCGGAT	CATACCTCGC GTATGGAGCG

## FIG._42G

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls Target Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 98 of 154

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4201	TCTGCTAATC	CTGTTACCAG	TGGCTGCTGC	CAGTGGCGAT	AAGTCGTGTC	TTACCGGGTT	GGACTCAAGA
	AGACGATTAG	GACAATGGTC	ACCGACGACG	GTCACCGCTA	TTCAGCACAG	AATGGCCCAA	CCTGAGTTCT
4271	CGATAGTTAC GCTATCAATG	CGGATAAGGC GCCTATTCCG	GCAGCGGTCG	GGCTGAACGG CCGACTTGCC	GGGGTTCGTG CCCCAAGCAC	CACACAGCCC GTGTGTCGGG	AGCTTGGAGC TCGAACCTCG
4341	GAACGACCTA	CACCGAACTG	AGATACCTAC	AGCGTGAGCT	ATGAGAAAGC	GCCACGCTTC	CCGAAGGGAG
	CTTGCTGGAT	GTGGCTTGAC	TCTATGGATG	TCGCACTCGA	TACTCTTTCG	CGGTGCGAAG	GGCTTCCCTC
4411	AAAGGCGGAC	AGGTATCCGG	TAAGCGGCAG	GGTCGGAACA	GGAGAGCGCA	CGAGGGAGCT	TCCAGGGGA
	TTTCCGCCTG	TCCATAGGCC	ATTCGCCGTC	CCAGCCTTGT	CCTCTCGCGT	GCTCCCTCGA	AGGTCCCCCT
4481	AACGCCTGGT	ATCTTTATAG	TCCTGTCGGG	TTTCGCCACC	TCTGACTTGA	GCGTCGATTT	TTGTGATGCT
	TTGCGGACCA	TAGAAATATC	AGGACAGCCC	AAAGCGGTGG	AGACTGAACT	CGCAGCTAAA	AACACTACGA
4551	CGTCAGGGGG	GCGGAGCCTA	TGGAAAAACG ACCTTTTTGC	CCAGCAACGC GGTCGTTGCG	GGCCTTTTTA CCGGAAAAAT	CGGTTCCTGG GCCAAGGACC	CCTTTTGCTG GGAAAACGAC
4621	GCCTTTTGCT	CACATGTTCT	TTCCTGCGTT	ATCCCCTGAT	TCTGTGGATA	ACCGTATTAC	CGCCTTTGAG
	CGGAAAACGA	GTGTACAAGA	AAGGACGCAA	TAGGGGACTA	AGACACCTAT	TGGCATAATG	GCGGAAACTC
4691	TGAGCTGATA ACTCGACTAT	CCGCTCGCCG	CAGCCGAACG GTCGGCTTGC	<b>A</b> CCGAGCGCA TGGCTCGCGT	GCGAGTCAGT CGCTCAGTCA	GAGCGAGGAA CTCGCTCCTT	GCGGAAGAGC CGCCTTCTCG
4761	GCCCAATACG CGGGTTATGC	CAAACCGCCT GTTTGGCGGA	CTCCCCGCGC	GTTGGCCGAT	TCATTAATGC AGTAATTACG	AGCTGGCACG TCGACCGTGC	ACAGGTTTCC TGTCCAAAGG
4831	CGACTGGAAA	GCGGGCAGTG	AGCGCAACGC	AATTAATGTG	AGTTAGCTCA	CTCATTAGGC	ACCCCAGGCT
	GCTGACCTTT	CGCCCGTCAC	TCGCGTTGCG	TTAATTACAC	TCAATCGAGT	GAGTAATCCG	TGGGGTCCGA
4901	TTACACTTTA AATGTGAAAT	TGCTTCCGGC	TCGTATGTTG AGCATACAAC	TGTGGAATTG ACACCTTAAC	TGAGCGGATA ACTCGCCTAT	ACAATTTCAC TGTTAAAGTG	ACAGGAAACA TGTCCTTTGT

## FIG._42H

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted Expression of Genes Encoding Cell Wall..." SN# 09/991,209; Dunn-Coleman et al. 209 .070202 Docket No. GC648-2 Sheet 99 of 154

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NCOL

KpnI

1

GCTATGACCA TGATTACGCC AAGCGCGCAA TTAACCCTCA CTAAAGGGAA CAAAAGCTGG GTAC CGATACTGGT ACTAATGCGG TTCGCGCGTT AATTGGGAGT GATTTCCCTT GTTTTCGACC CATG

4971

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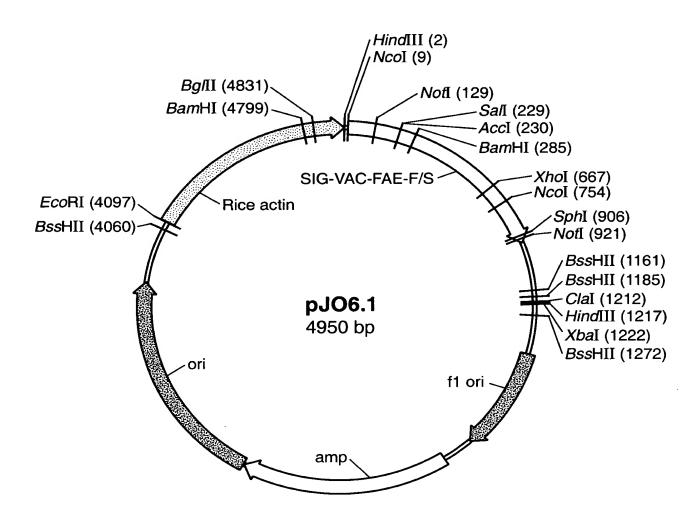


FIG._43A

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CTC CTCCTGGCGC TCGCCGTGCT GGCCACGGCC GCCGTCGCCG	ACCCGATCCG GCCCGTCACC GACCGCGC	CCG TTTAGTCGAA ATGGCCACTA TCTCCCAAGC TGCCTACGCC	ATC AAGGAGAGA AAATTTACAA TTCTCAAACT GACATTAACG	AAG AAATAATCAC CGTCTTCCGT GGCACTGGTA GTGATACGAA	CAC GCCTTTCGAC ACCCTACCAC AATGCAACGG TTGTGAAGTA	TCC GTCCAGGACC AAGTCGAGTC GCTTGTCAAA CAGCAGGTTA	TGA CCGGCCACKC CCTCGGCGCC TCCCTGGCGG CACTCACTGC	CAT CCGCCTGTAC ACCTTCGGCG AACCGCGCAG CGGCAATCAG
GAG GAGGACCGCG AGCGGCACGA CCGGTGCCGG CGGCAGCGGC	TGGGCTAGGC CGGGCAGTGG CTGGCGCG	GGC AAATCAGCTT TACCGGTGAT AGAGGGTTCG ACGGATGCGG	TAG TTCCCTCTCT TTTAAATGTT AAGAGTTTGA CTGTAATTGC	TTC TTTATTAGTG GCAGAAGGCA CCGTGACCAT CACTATGCTT	GTG CGGAAAGCTG TGGGATGGTG TTACGTTGCC AACACTTCAT	AGG CAGGTCCTGG TTCAGCTCAG CGAACAGTTT GTCGTCCAAT	ACT GGCCGGTGMG GGAGCCGCGG AGGGACCGCC GTGAGTGACG	
HindIII Ncoi 	71 TCGCCTCCTC CTCCTTC GCCGACTCCA AGCGGAGGAG GAGGAGGAG CGGCTGAGGT	141 GCAGGGCATC TCCGAAGACC TCTACAGCCG CGTCCCGTAG AGGCTTCTGG AGATGTCGGC	Sali  Acci  Acci  211 GACCTGTGCA ACATTCCGTC GACTATTATC  CTGGACACGT TGTAAGGCAG CTGATAATAG	BamHI 281 GATGGATCCT CCGCGACGAC AGCAGCAAAG CTACCTAGGA GGCGCTGCTG TCGTCGTTTC	351 TCTACAACTC GATACTAACT ACACCCTCAC AGATGTTGAG CTATGATTGA TGTGGGAGTG	421 CACGGTGGAT ATTATATTGG ATGGGTCTCC GTGCCACCTA TAATATAACC TACCCAGAGG	491 GCCAGTATCC GGACTACGCG CTGACCGTGA CGGTCATAGG CCTGATGCGC GACTGGCACT	561 CGCCCAGCTG TCTGCGACAT ACGACAACAT

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls 50 Targete Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 102 of 154

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### CAAGCCTCGA GCCCAGATAC GACGCAGTAT TTCCGGGTCA CGGAAGCGCA GCATGTACTT GCTACGGAAG GTTCGGAGCT CGGGTCTATG CTGCGTCATA AAGGCCCAGT GTGTAGAGTA CACATCTCAT GTGCTGTGAG CTAGGAATGT CGCGGGTCTT GTGTAAACAG ACGTGACCCC TACTTCACGT CACGACACTC GCATGCACCT CGTACGTGGA GGCCGCGGAA ACCACTGAAG GATGAGCTGT AAAGAAGCAG ATCGTTCAAA CATTTGGCAA GTAAACCGTT TTGAATTACG ACTAATAGTA TATTAAAGAC AACTTAATGC TTAAGCATGT AATAATTAAC ATGTAATGCA TGACGTTATT TATGAGATGG GTTTTTATGA TTAGAGTCCC 11111 Sphi GCGCCCAGAA CACATTTGTC TGCACTGGGG ATGAAGTGCA CTGTCCCACA CTTATTACGC GTGTGCTGAA TAAAACCCTA CTGCTCGCCG TGATTATCAT ATAATTTCTG GCCCATGGCG GCTGCCGTAG GGTTTGGACG GGGCCCACCT CGTCCCCATG CGGGTACCGC TTTCTTCGTC TAGCAAGTTT GACGAGCGGC NCOL ATTTTGGGAT GCAGGGGTAC CCCCGGTGGA CCGGCGCCTT TGGTGACTTC CTACTCGACA CCAGAACGCT CACACGACTT GGTCTTGCGA CGACGGCATC CCAAACCTGC AGGACAACGG CGATGCCTTC GAATAATGCG TCCTGTTGCC CGTACATGAA GATCCTTACA GACAGGGTGT ATTICAAAGA ATICIAACIT TAAGATTGAA Noti GCCTTCGCGT SACCTCGCAA GGCCGGTCGC CCGCCAGCG CTCATGCCAA GAGTACGGTT CTGGAGCGTT GCCCAGGGCG CGGGTCCCGC TAAAGTTTCT 631 701 771 841 911 981 1051

XhoI

## FIG._43C

CGATAGAAAA CAAAATATAG CGCGCAAACT AGGATAAATT ATCGCGCGCG

GCTATCTTTT GTTTTATATC GCGCGTTTGA

ATTTAATACG TAAATTATGC

CGTTAATATG

GCAATTATAC

1121

TAGCGCGCGC

TCCTATTTAA

AATTCGTACA TTATTAATTG TACATTACGT ACTGCAATAA ATACTCTACC CAAAAATACT AATCTCAGGG

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1191	GTGTCATCTA CACAGTAGAT	_ TGTTACTAGA ACAATGATCT	TCGATAAGCT	TCTAGAGCGG AGATCTCGCC	CCGGTGGAGC GGCCACCTCG	TCCAATTCGC AGGTTAAGCG	CCTATAGTGA GGATATCACT
		BSSHII					
1261	GTCGTATTAC CAGCATAATG	GCGCGCTCAC	TGGCCGTCGT ACCGGCAGCA	TTTACAACGT AAATGTTGCA	CGTGACTGGG GCACTGACCC	AAAACCCTGG TTTTGGGACC	CGTTACCCAA GCAATGGGTT
1331	CTTAATCGCC	TTGCAGCACA	TCCCCCTTTC	GCCAGCTGGC	GTAATAGCGA	AGAGGCCCGC	ACCGATCGCC
	GAATTAGCGG	AACGTCGTGT	AGGGGGAAAG	CGGTCGACCG	CATTATCGCT	TCTCCGGGCG	TGGCTAGCGG
1401	CTTCCCAACA GAAGGGTTGT	GTTGCGCAGC CAACGCGTCG	CTGAATGGCG GACTTACCGC	AATGGGACGC TTACCCTGCG	GCCCTGTAGC CGGGACATCG	GGCGCATTAA CCGCGTAATT	ວວວອວວອວອວ
1471	TGTGGTGGTT	ACGCGCAGCG	TGACCGCTAC	ACTTGCCAGC	GCCCTAGCGC	CCGCTCCTTT	CGCTTTCTTC
	ACACCACCAA	TGCGCGTCGC	ACTGGCGATG	TGAACGGTCG	CGGGATCGCG	GGCGAGGAAA	GCGAAAGAAG
1541	CCTTCCTTTC	TCGCCACGTT	CGCCGGCTTT	CCCCGTCAAG	CTCTAAATCG	GGGGCTCCCT	TTAGGGTTCC
	GGAAGGAAAG	AGCGGTGCAA	GCGGCCGAAA	GGGGCAGTTC	GAGATTTAGC	CCCCGAGGGA	AATCCCAAGG
1611	GATTTAGTGC	TTTACGGCAC	CTCGACCCCA	AAAAACTTGA	TTAGGGTGAT	GGTTCACGTA	GTGGGCCATC
	CTAAATCACG	AAATGCCGTG	GAGCTGGGGT	TTTTTGAACT	AATCCCACTA	CCAAGTGCAT	CACCCGGTAG
1681	GCCCTGATAG	ACGGTTTTTC	GCCCTTTGAC	GTTGGAGTCC	ACGTTCTTTA	ATAGTGGACT	CTTGTTCCAA
	CGGGACTATC	TGCCAAAAG	CGGGAAACTG	CAACCTCAGG	TGCAAGAAAT	TATCACCTGA	GAACAAGGTT
1751	ACTGGAACAA	CACTCAACCC	TATCTCGGTC	TATTCTTTTG	atttataagg	GATTTTGCCG	ATTTCGGCCT
	TGACCTTGTT	GTGAGTTGGG	ATAGAGCCAG	ATAAGAAAAC	taaatattcc	CTAAAACGGC	TAAAGCCGGA
1821	ATTGGTTAAA AA	AAATGAGCTG	ATTTAACAAA	AATTTAACGC	GAATTTTAAC	AAAATATTAA	CGCTTACAAT
	TAACCAATTT TT	TTTACTCGAC	TAAATTGTTT	TTAAATTGCG	CTTAAAATTG	TTTTATAATT	GCGAATGTTA

XbaI

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeter Expression of Genes Encoding Cell Wall..."

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1891	TTAGGTGGCA AATCCACCGT	CTTTTCGGGG GAAAAGCCCC	AAATGTGCGC TTTACACGCG	GGAACCCCTA	TTTGTTTATT AAACAAATAA	TTTCTAAATA AAAGATTTAT	CATTCAAATA GTAAGTTTAT
1961	TGTATCCGCT	CATGAGACAA	TAACCCTGAT	AAATGCTTCA	ATAATATTGA	AAAAGGAAGA	GTATGAGTAT
	ACATAGGCGA	GTACTCTGTT	ATTGGGACTA	TTTACGAAGT	TATTATAACT	TTTTCCTTCT	CATACTCATA
2031	TCAACATTTC	CGTGTCGCCC	TTATTCCCTT	TTTTGCGGCA	TTTTGCCTTC	CTGTTTTTGC	TCACCCAGAA
	AGTTGTAAAG	GCACAGCGGG	AATAAGGGAA	AAAACGCCGT	AAAACGGAAG	GACAAAAACG	AGTGGGTCTT
2101	ACGCTGGTGA	AAGTAAAAGA	TGCTGAAGAT	CAGTTGGGTG	CACGAGTGGG	TTACATCGAA	CTGGATCTCA
	TGCGACCACT	TTCATTTTCT	ACGACTTCTA	GTCAACCCAC	GTGCTCACCC	AATGTAGCTT	GACCTAGAGT
2171	ACAGCGGTAA	GATCCTTGAG	AGTTTTCGCC	CCGAAGAACG	TTTTCCAATG	ATGAGCACTT	TTAAAGTTCT
	TGTCGCCATT	CTAGGAACTC	TCAAAAGCGG	GGCTTCTTGC	AAAAGGTTAC	TACTCGTGAA	AATTTCAAGA
2241	GCTATGTGGC CGATACACCG	GCGGTATTAT CGCCATAATA	CCCGTATTGA GGGCATAACT	CGCCGGGCAA GCGGCCCGTT	GAGCAACTCG CTCGTTGAGC	GTCGCCGCAT	ACACTATTCT TGTGATAAGA
2311	CAGAATGACT	TGGTTGAGTA	CTCACCAGTC	ACAGAAAAGC	ATCTTACGGA	TGGCATGACA	GTAAGAGAAT
	GTCTTACTGA	ACCAACTCAT	GAGTGGTCAG	TGTCTTTTCG	TAGAATGCCT	ACCGTACTGT	CATTCTCTTA
2381	TATGCAGTGC	TGCCATAACC	ATGAGTGATA	ACACTGCGGC	CAACTTACTT	CTGACAACGA	TCGGAGGACC
	ATACGTCACG	ACGGTATTGG	TACTCACTAT	TGTGACGCCG	GTTGAATGAA	GACTGTTGCT	AGCCTCCTGG
2451	GAAGGAGCTA	ACCGCTTTTT	TGCACAACAT	GGGGGATCAT	GTAACTCGCC	TTGATCGTTG	GGAACCGGAG
	CTTCCTCGAT	TGGCGAAAAA	ACGTGTTGTA	CCCCCTAGTA	CATTGAGCGG	AACTAGCAAC	CCTTGGCCTC
2521	CTGAATGAAG GACTTACTTC	CCATACCAAA GGTATGGTTT	CGACGAGCGT GCTGCTCGCA	GACACCACGA CTGTGGTGCT	TGCCTGTAGC	AATGGCAACA TTACCGTTGT	ACGTTGCGCA TGCAACGCGT
2591	AACTATTAAC TTGATAATTG	TGGCGAACTA ACCGCTTGAT	CTTACTCTAG GAATGAGATC	CTTCCCGGCA	ACAATTAATA TGTTAATTAT	GACTGGATGG CTGACCTACC	AGGCGGATAA TCCGCCTATT
2661	AGTTGCAGGA TCAACGTCCT	CCACTTCTGC GGTGAAGACG	GCTCGGCCCT	TCCGGCTGGC AGGCCGACCG	TGGTTTATTG ACCAAATAAC	CTGATAAATC GACTATTTAG	TGGAGCCGGT ACCTCGGCCA

### F/G._43E

"Manipulation of the Phenolic Acid Conte Digestibility of Plant Cell Walls by Target Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 105 of 154

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2731	GAGCGTGGGT	CTCGCGGTAT GAGCGCCATA	CATTGCAGCA GTAACGTCGT	CTGGGGCCAG	ATGGTAAGCC TACCATTCGG	CTCCCGTATC GAGGGCATAG	GTAGTTATCT CATCAATAGA
2801	ACACGACGGG	GAGTCAGGCA	ACTATGGATG	AACGAAATAG	ACAGATCGCT	GAGATAGGTG	CCTCACTGAT
	TGTGCTGCCC	CTCAGTCCGT	TGATACCTAC	TTGCTTTATC	TGTCTAGCGA	CTCTATCCAC	GGAGTGACTA
2871	TAAGCATTGG ATTCGTAACC	TAACTGTCAG ATTGACAGTC	ACCAAGTTTA	CTCATATATA GAGTATATAT	CTTTAGATTG GAAATCTAAC	ATTTAAAACT TAAATTTTGA	TCATTTTAA AGTAAAAATT
2941	TTTAAAAGGA	TCTAGGTGAA	GATCCTTTTT	GATAATCTCA	TGACCAAAAT	CCCTTAACGT	GAGTTTTCGT
	AAATTTTCCT	AGATCCACTT	CTAGGAAAAA	CTATTAGAGT	ACTGGTTTTA	GGGAATTGCA	CTCAAAAGCA
3011	TCCACTGAGC	GTCAGACCCC	GTAGAAAAGA	TCAAAGGATC	TTCTTGAGAT	CCTTTTTTTC	TGCGCGTAAT
	AGGTGACTCG	CAGTCTGGGG	CATCTTTTCT	AGTTTCCTAG	AAGAACTCTA	GGAAAAAAG	ACGCGCATTA
3081	CTGCTGCTTG	CAAACAAAAA	AACCACCGCT	ACCAGCGGTG	GTTTGTTTGC	CGGATCAAGA	GCTACCAACT
	GACGACGAAC	GTTTGTTTTT	TTGGTGGCGA	TGGTCGCCAC	CAAACAAACG	GCCTAGTTCT	CGATGGTTGA
3151	CTTTTTCCGA	AGGTAACTGG	CTTCAGCAGA	GCGCAGATAC	CAAATACTGT	CCTTCTAGTG	TAGCCGTAGT
	GAAAAAGGCT	TCCATTGACC	GAAGTCGTCT	CGCGTCTATG	GTTTATGACA	GGAAGATCAC	ATCGGCATCA
3221	TAGGCCACCA	CTTCAAGAAC GAAGTTCTTG	TCTGTAGCAC AGACATCGTG	CGCCTACATA GCGGATGTAT	CCTCGCTCTG GGAGCGAGAC	CTAATCCTGT GATTAGGACA	TACCAGTGGC ATGGTCACCG
3291	TGCTGCCAGT	GGCGATAAGT	CGTGTCTTAC	CGGGTTGGAC	TCAAGACGAT	AGTTACCGGA	TAAGGCGCAG
	ACGACGGTCA	CCGCTATTCA	GCACAGAATG	GCCCAACCTG	AGTTCTGCTA	TCAATGGCCT	ATTCCGCGTC
3361	CGGTCGGGCT	GAACGGGGGG	TTCGTGCACA AAGCACGTGT	CAGCCCAGCT	TGGAGCGAAC ACCTCGCTTG	GACCTACACC CTGGATGTGG	GAACTGAGAT CTTGACTCTA
3431	ACCTACAGCG TGGATGTCGC	TGAGCTATGA ACTCGATACT	GAAAGCGCCA CTTTCGCGGT	CGCTTCCCGA GCGAAGGGCT	AGGGAGAAAG TCCCTCTTTC	GCGGACAGGT	ATCCGGTAAG TAGGCCATTC
3501	CGGCAGGGTC	GGAACAGGAG CCTTGTCCTC	AGCGCACGAG TCGCGTGCTC	GGAGCTTCCA CCTCGAAGGT	GGGGGAAACG CCCCCTTTGC	CCTGGTATCT GGACCATAGA	TTATAGTCCT AATATCAGGA

### FIG._43F

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Target 1 2 9 2 2 2 Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 106 of 154

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3571	GTCGGGTTTC	GCCACCTCTG	ACTTGAGCGT	CGATTTTTGT	GATGCTCGTC	AGGGGGGCGG	AGCCTATGGA
	CAGCCCAAAG	CGGTGGAGAC	TGAACTCGCA	GCTAAAAACA	CTACGAGCAG	TCCCCCCGCC	TCGGATACCT
3641	AAAACGCCAG	CAACGCGGCC	TTTTTACGGT	TCCTGGCCTT	TTGCTGGCCT	TTTGCTCACA	TGTTCTTTCC
	TTTTGCGGTC	GTTGCGCCGG	AAAAATGCCA	AGGACCGGAA	AACGACCGGA	AAACGAGTGT	ACAAGAAAGG
3711	TGCGTTATCC	CCTGATTCTG	TGGATAACCG	TATTACCGCC	TTTGAGTGAG	CTGATACCGC	TCGCCGCAGC
	ACGCAATAGG	GGACTAAGAC	ACCTATTGGC	ATAATGGCGG	AAACTCACTC	GACTATGGCG	AGCGGCGTCG
3781	CGAACGACCG	AGCGCAGCGA	GTCAGTGAGC	GAGGAAGCGG	AAGAGCGCCC	AATACGCAAA	CCGCCTCTCC
	GCTTGCTGGC	TCGCGTCGCT	CAGTCACTCG	CTCCTTCGCC	TTCTCGCGGG	TTATGCGTTT	GGCGGAGAGG
3851	CCGCGCGTTG	GCCGATTCAT CGGCTAAGTA	TAATGCAGCT ATTACGTCGA	GGCACGACAG CCGTGCTGTC	GTTTCCCGAC CAAAGGGCTG	TGGAAAGCGG ACCTTTCGCC	GCAGTGAGCG CGTCACTCGC
3921	CAACGCAATT	AATGTGAGTT	AGCTCACTCA	TTAGGCACCC	CAGGCTTTAC	ACTTTATGCT	TCCGGCTCGT
	GTTGCGTTAA	TTACACTCAA	TCGAGTGAGT	AATCCGTGGG	GTCCGAAATG	TGAAATACGA	AGGCCGAGCA
3991	ATGTTGTGTG TACAACACAC	GAATTGTGAG CTTAACACTC	CGGATAACAA GCCTATTGTT	TTTCACACAG AAAGTGTGTC	GAAACAGCTA CTTTGTCGAT	TGACCATGAT ACTGGTACTA	BSSHII ~~ TACGCCAAGC ATGCGGTTCG
4061	BSSHII ~~~~ GCGCAATTAA CGCGTTAATT	BSSHII ~~~~ GCGCAATTAA CCCTCACTAA CGCGTTAATT GGGAGTGATT	AGGGAACAAA TCCCTTGTTT	ECORI ZZZZZZZ AGCTGGAATT C TCGACCTTAA G	: CCACAATGAA GGTGTTACTT	CAATAATAAG GTTATTATTC	ATTAAAATAG TAATTTTATC
4131	CTTGCCCCCG	TTGCAGCGAT AACGTCGCTA	GGGTATTTT CCCATAAAAA	TCTAGTAAAA AGATCATTTT	TAAAAGATAA ATTTTCTATT	ACTTAGACTC TGAATCTGAG	AAAACATTTA TTTTGTAAAT
4201	CAAAAACAAC GTTTTTGTTG	CCCTAAAGTC GGGATTTCAG	CTAAAGCCCA GATTTCGGGT	AAGTGCTATG TTCACGATAC	CACGATCCAT GTGCTAGGTA	AGCAAGCCCA TCGTTCGGGT	GCCCAACCCA

## FIG._43G

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4271	ACCCAACCCA ACC TGGGTTGGGT TGG	ACCCACCCCA TGGGTGGGGT	GTGCAGCCAA CACGTCGGTT	CTGGCAAATA GACCGTTTAT	GTCTCCACCC CAGAGGTGGG	CCGGCACTAT GGCCGTGATA	CACCGTGAGT GTGGCACTCA
4341	TGTCCGCACC ACC ACAGGCGTGG TGG	ACCGCACGTC TGGCGTGCAG	TCGCAGCCAA AGCGTCGGTT	AAAAAAAAA TTTTTTTTT	AGAAAGAAAA TCTTTCTTTT	AAAAGAAAAA TTTTCTTTTT	GAAAACAGC CTTTTGTCG
4411	AGGTGGGTCC TCCACCCAGG	GGGTCGTGGG CCCAGCACCC	GGCCGGAAAA CCGGCCTTTT	GCGAGGAGGA	TCGCGAGCAG AGCGCTCGTC	CGACGAGGCC GCTGCTCCGG	CGGCCCTCCC
4481	TCCGCTTCCA AGGCGAAGGT	AAGAAACGCC TTCTTTGCGG	CCCCATCGCC GGGGTAGCGG	ACTATATACA TGATATATGT	TACCCCCCCC	TCTCCTCCCA AGAGGAGGGT	TCCCCCCAAC AGGGGGGTTG
4551	CCTACCACCA GGATGGTGGT	CCACCACCAC	CACCTCCTCC GTGGAGGAGG	CCCCTCGCTG GGGGAGCGAC	CCGGACGACG GGCCTGCTGC	AGCTCCTCCC TCGAGGAGGG	CCCTCCCCCT GGGAGGGGGA
4621	ອວອອວອອວອອ ວອວວອວວອວວ	CGGTAACCAC GCCATTGGTG	CCCGCCCCTC	TCCTCTTTCT AGGAGAAAGA	TTCTCCGTTT AAGAGGCAAA	TTTTTTCGT AAAAAAAGCA	CTCGGTCTCG GAGCCAGAGC
4691	ATCTTTGGCC TAGAAACCGG	TTGGTAGTTT AACCATCAAA	GGGTGGGCGA CCCACCCGCT	GAGCGGCTTC CTCGCCGAAG	GTCGCCCAGA	TCGGTGCGCG	GGAGGGGGG
				BamHI	HI		Bglii
4761	GATCTCGCGG CTAGAGCGCC	CTGGCGTCTC GACCGCAGAG	CGGGCGTGAG GCCCGCACTC	TCGGCCCGGA TCC	TCCTCGCGGG	GAATGGGGCT CTTACCCCGA	CTCGGATGTA GAGCCTACAT
4831	Bglii ~~~~ GATCTTCTTT CTAGAAGAAA	CTTTCTTCTT GAAAGAAGAA	TTTGTGGTAG AAACACCATC	AATTTGAATC TTAAACTTAG	CCTCAGCATT GGAGTCGTAA	GTTCATCGGT CAAGTAGCCA	AGTTTTTCTT TCAAAAGAA
4901	TTCATGATTT AAGTACTAAA	GTGACAAATG CACTGTTTAC	CAGCCTCGTG GTCGGAGCAC	CGGAGCTTTT GCCTCGAAAA	TTGTAGGTAG AACATCCATC		

## FIG._43H

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls. To get 200 - 070202 Expression of Genes Encoding Cell Wall. SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 108 of 154

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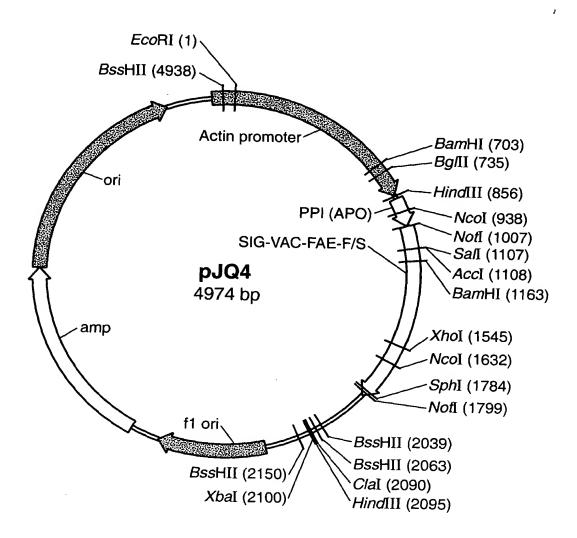


FIG._44A

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н	AATTCCACAA TTAAGGTGTT	TGAACAATAA ACTTGTTATT	TAAGATTAAA ATTCTAATTT	ATAGCTTGCC TATCGAACGG	CCCGTTGCAG GGGCAACGTC	CGATGGGTAT GCTACCCATA	tttttctagt Aaaaagatca
71	AAAATAAAAG TTTTATTTTC	ATAAACTTAG TATTTGAATC	ACTCAAAACA TGAGTTTTGT	TTTACAAAAA AAATGTTTTT	CAACCCCTAA	AGTCCTAAAG TCAGGATTTC	CCCAAAGTGC GGGTTTCACG
141	TATGCACGAT ATACGTGCTA	CCATAGCAAG GGTATCGTTC	CCCAGCCCAA GGGTCGGGTT	CCCAACCCAA GGGTTGGGTT	CCCAACCCAC	CCCAGTGCAG	CCAACTGGCA GGTTGACCGT
211	AATAGTCTCC TTATCAGAGG	ACCCCCGGCA	CTATCACCGT	GAGTTGTCCG CTCAACAGGC	CACCACCGCA GTGGTGGCGT	CGTCTCGCAG GCAGAGCGTC	CCAAAAAAA GGTTTTTTT
281	AAAAAGAAAG TTTTTCTTTC	AAAAAAAAGA TTTTTTTCT	AAAAGAAAAA TTTTCTTTTT	CAGCAGGTGG GTCGTCCACC	GTCCGGGTCG	TGGGGGCCGG	AAAAGCGAGG TTTTCGCTCC
351	AGGATCGCGA TCCTAGCGCT	GCAGCGACGA	໑໑໑ຉຉ໑໑໑ຉຉ	TCCCTCCGCT AGGGAGGCGA	TCCAAAGAAA AGGTTTCTTT	CGCCCCCCAT	CGCCACTATA GCGGTGATAT
421	TACATACCCC	CCCCTCTCCT GGGGAGAGGA	CCCATCCCCC	CAACCCTACC GTTGGGATGG	ACCACCACCA TGGTGGTGGT	CCACCACCTC	CTCCCCCTC
491	GCTGCCGGAC	GACGAGCTCC CTGCTCGAGG	TCCCCCCTCC AGGGGGGAGG	CCCTCCGCCG	CCGCCGGTAA GGCGGCCATT	CCACCCGCC	CCTCTCCTCT GGAGAGGAGA
561	TTCTTTCTCC AAGAAAGAGG	GTTTTTTTT CAAAAAAAA	TCGTCTCGGT AGCAGAGCCA	CTCGATCTTT GAGCTAGAAA	GGCCTTGGTA CCGGAACCAT	GTTTGGGTGG CAAACCCACC	GCGAGAGCGG
631	CTTCGTCGCC GAAGCAGCGG	CAGATCGGTG GTCTAGCCAC	CGCGGGAGGG	GCGGGATCTC	GCGGCTGGCG	TCTCCGGGCG	TGAGTCGGCC ACTCAGCCGG
	BamHI			Bglii			
701	CGGATCCTCG GCCTAGGAGC	CGGGGAATGG GCCCCTTACC	GGCTCTCGGA	TGTAGATCTT ACATCTAGAA	CTTTCTTTCT GAAAGAAAGA	TCTTTTTGTG AGAAAAACAC	GTAGAATTTG CATCTTAAAC

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771	AATCCCTCAG TTAGGGAGTC	CATTGTTCAT GTAACAAGTA	CGGTAGTTTT GCCATCAAAA	TCTTTTCATG AGAAAAGTAC	ATTTGTGACA TAAACACTGT	AATGCAGCCT TTACGTCGGA	CGTGCGGAGC GCACGCCTCG
841	TTTTTTGTAG AAAAAACATC	HindIII ~~~~~ GTAGAAGCTT CATCTTCGAA	ACMATGGMCG TGKTACCKGC	TGCACAAGGA ACGTGTTCCT	GGTSAACTTC CCASTTGAAG	GTSGCCTACC CASCGGATGG	TCCTGATCGT AGGACTAGCA
911	SCTCGGCCTC SGAGCCGGAG	CTCTTGCTCG GAGAACGAGC	NCOI TSTCCGCCAT G ASAGGCGGTA C	GGAGCACGTG	GACGCCAAGG CTGCGGTTCC	CCTGCACCCK GGACGTGGGM	CGAGTGCGGC GCTCACGCCG
981	AACCTCGGCT TTGGAGCCGA	TCGGCATCTG AGCCGTAGAC	Noti CCCGGCGGCC GGGCCGCCGG	GCTCCACGC	AGGGCATCTC TCCCGTAGAG	CGAAGACCTC GCTTCTGGAG	TACAGCCGTT ATGTCGGCAA
1051	TAGTCGAAAT ATCAGCTTTA	GGCCACTATC CCGGTGATAG	TCCCAAGCTG AGGGTTCGAC	CCTACGCCGA	CCTGTGCAAC	Sali Acci ATTCCGTCGA C	~~ CTATTATCAA GATAATAGTT
1121	GGGAGAGAAA CCCTCTCTTT	ATTTACAATT TAAATGTTAA	CTCAAACTGA GAGTTTGACT	CATTAACGGA GTAATTGCCT	Bamhi ~~~~~ TGGATCCTCC	GCGACGACAG	CAGCAAAGAA GTCGTTTCTT
1191	ATAATCACCG TATTAGTGGC	TCTTCCGTGG AGAAGGCACC	CACTGGTAGT GTGACCATCA	GATACGAATC CTATGCTTAG	TACAACTCGA ATGTTGAGCT	TACTAACTAC ATGATTGATG	ACCCTCACGC TGGGAGTGCG
1261	CTTTCGACAC GAAAGCTGTG	CCTACCACAA GGATGGTGTT	TGCAACGGTT ACGTTGCCAA	GTGAAGTACA CACTTCATGT	CGGTGGATAT GCCACCTATA	TATATTGGAT ATATAACCTA	GGGTCTCCGT CCCAGAGGCA

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1331	CCAGGACCAA GGTCCTGGTT	GTCGAGTCGC CAGCTCAGCG	TTGTCAAACA	GCAGGTTAGC CGTCCAATCG	CAGTATCCGG	ACTACGCGCT TGATGCGCGA	GACCGTGACC CTGGCACTGG	
1401	GGCCACKCCC	TCGGCGCCTC AGCCGCGGAG	CCTGGCGGCA	CTCACTGCCG	CCCAGCTGTC	TGCGACATAC ACGCTGTATG	GACAACATCC CTGTTGTAGG	
1471	GCCTGTACAC CGGACATGTG	CTTCGGCGAA GAAGCCGCTT	CCGCGCAGCG	GCAATCAGGC	CTTCGCGTCG	TACATGAACG ATGTACTTGC	ATGCCTTCCA TACGGAAGGT	
1541	XhoI ~~~~~ AGCCTCGAGC TCGGAGCTCG	CCAGATACGA GGTCTATGCT	CGCAGTATTT GCGTCATAAA	CCGGGTCACT GGCCCAGTGA	CATGCCAACG GTACGGTTGC	ACGGCATCCC TGCCGTAGGG	AAACCTGCCC TTTGGACGGG	
1611	CCGGTGGAGC GGCCACCTCG	AGGGGTACGC TCCCCATGCG	Ncol CCATGGCGGT GGTACCGCCA	GTAGAGTACT CATCTCATGA	GGAGCGTTGA CCTCGCAACT	TCCTTACAGC AGGAATGTCG	GCCCAGAACA CGGGTCTTGT	
1681	CATTTGTCTG GTAAACAGAC	CACTGGGGAT GTGACCCCTA	GAAGTGCAGT CTTCACGTCA	GCTGTGAGGC	CCAGGGCGGA	CAGGGTGTGA GTCCCACACT	ATAATGCGCA TATTACGCGT	
			R T	Sphi	Noti	H .		
1751	CACGACTTAT GTGCTGAATA	TTTGGGATGA AAACCCTACT		CGAGCGCGC ATGCACCTGG GCTCGCCGCG TACGTGGACC	CCGGTCGCGG	CCGCGGAAAC GGCGCCTTTG	CACTGAAGGA GTGACTTCCT	
1821	TGAGCTGTAA ACTCGACATT	AGAAGCAGAT TCTTCGTCTA	CGTTCAAACA GCAAGTTTGT	TTTGGCAATA AAACCGTTAT	AAGTTTCTTA TTCAAAGAAT	AGATTGAATC TCTAACTTAG	CTGTTGCCGG GACAACGGCC	
1891	TCTTGCGATG AGAACGCTAC	: ATTATCATAT : TAATAGTATA	AATTTCTGTT TTAAAGACAA	GAATTACGTT CTTAATGCAA	AAGCATGTAA TTCGTACATT	TAATTAACAT ATTAATTGTA	GTAATGCATG CATTACGTAC	
1961	ACGTTATTTA TGCAATAAAT	TGAGATGGGT	TTTTATGATT AAAATACTAA	AGAGTCCCGC TCTCAGGGCG	AATTATACAT TTAATATGTA	TTAATACGCG AATTATGCGC	ATAGAAAACA TATCTTTTGT	

# -1G._44D

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted xpression of Genes Encoding Cell Wall..."

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	BSSHII	11		Bsshii		ClaI	XbaI ~~ II HindIII
2031	AAATATAGCG TTTATATCGC	AAATATAGCG CGCAAACTAG TTTATATCGC GCGTTTGATC	GATAAATTAT CTATTTAATA	CGCGCGCGGT	GTCATCTATG CAGTAGATAC	TTACTAGATC	ATC GATAAGCTTC TAG CTATTCGAAG
	xbaI				B S	BssHII	
2101	TAGAGCGGCC	GGTGGAGCTC CCACCTCGAG	CAATTCGCCC GTTAAGCGGG	TATAGTGAGT ATATCACTCA	CGTATTACGC GCATAATGCG	GCGCTCACTG	GCCGTCGTTT CGGCAGCAAA
2171	TACAACGTCG	TGACTGGGAA ACTGACCCTT	AACCCTGGCG TTGGGACCGC	TTACCCAACT AATGGGTTGA	TAATCGCCTT ATTAGCGGAA	GCAGCACATC	CCCCTTTCGC GGGGAAAGCG
2241	CAGCTGGCGT	AATAGCGAAG TTATCGCTTC	AGGCCCGCAC TCCGGGCGTG	CGATCGCCCT GCTAGCGGGA	TCCCAACAGT AGGGTTGTCA	TGCGCAGCCT ACGCGTCGGA	GAATGGCGAA CTTACCGCTT
2311	TGGGACGCGC	CCTGTAGCGG	CGCATTAAGC GCGTAATTCG	GCGGCGGGTG	TGGTGGTTAC ACCACCAATG	GCGCAGCGTG	ACCGCTACAC TGGCGATGTG
2381	TTGCCAGCGC AACGGTCGCG	CCTAGCGCCC GGATCGCGGG	GCTCCTTTCG CGAGGAAAGC	CTTTCTTCCC GAAAGAAGGG	TTCCTTTCTC AAGGAAAGAG	GCCACGTTCG CGGTGCAAGC	CCGGCTTTCC GGCCGAAAGG
2451	CCGTCAAGCT GGCAGTTCGA	CTAAATCGGG GATTTAGCCC	GGCTCCCTTT CCGAGGGAAA	AGGGTTCCGA TCCCAAGGCT	<b>TTTAGTGCTT</b> AAATCACGAA	TACGGCACCT ATGCCGTGGA	CGACCCCAAA GCTGGGGTTT
2521	AAACTTGATT TTTGAACTAA	AGGGTGATGG TCCCACTACC	TTCACGTAGT AAGTGCATCA	GGGCCATCGC CCCGGTAGCG	CCTGATAGAC GGACTATCTG	GGTTTTTCGC CCAAAAAGCG	CCTTTGACGT GGAAACTGCA
2591	TGGAGTCCAC ACCTCAGGTG	GTTCTTTAAT CAAGAAATTA	AGTGGACTCT TCACCTGAGA	TGTTCCAAAC ACAAGGTTTG	TGGAACAACA ACCTTGTTGT	CTCAACCCTA GAGTTGGGAT	TCTCGGTCTA AGAGCCAGAT
2661	TTCTTTTGAT AAGAAAACTA	TTATAAGGGA AATATTCCCT	TTTTGCCGAT AAAACGGCTA	TTCGGCCTAT AAGCCGGATA	TGGTTAAAAA ACCAATTTTT	ATGAGCTGAT TACTCGACTA	TTAACAAAA AATTGTTTTT

FIG._ 44E

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2731	TTTAACGCGA	ATTTTAACAA	AATATTAACG	CTTACAATTT	AGGTGGCACT	TTTCGGGGAA	ATGTGCGCGG
	AAATTGCGCT	TAAAATTGTT	TTATAATTGC	GAATGTTAAA	TCCACCGTGA	AAAGCCCCTT	TACACGCGCC
2801	AACCCCTATT	TGTTTATTT	TCTAAATACA	TTCAAATATG	TATCCGCTCA	TGAGACAATA	ACCCTGATAA
	TTGGGGATAA	ACAAATAAAA	AGATTTATGT	AAGTTTATAC	ATAGGCGAGT	ACTCTGTTAT	TGGGACTATT
2871	ATGCTTCAAT	AATATTGAAA	AAGGAAGAGT	ATGAGTATTC	AACATTTCCG	TGTCGCCCTT	ATTCCCTTTT
	TACGAAGTTA	TTATAACTTT	TTCCTTCTCA	TACTCATAAG	TTGTAAAGGC	ACAGCGGGAA	TAAGGGAAAA
2941	TTGCGGCATT	TTGCCTTCCT	GTTTTTGCTC	ACCCAGAAAC	GCTGGTGAAA	GTAAAAGATG	CTGAAGATCA
	AACGCCGTAA	AACGGAAGGA	CAAAAACGAG	TGGGTCTTTG	CGACCACTTT	CATTTTCTAC	GACTTCTAGT
3011	GTTGGGTGCA	CGAGTGGGTT GCTCACCCAA	<b>ACATCGAACT TGTAGCTTGA</b>	GGATCTCAAC CCTAGAGTTG	AGCGGTAAGA TCGCCATTCT	TCCTTGAGAG AGGAACTCTC	TTTTCGCCCC AAAAGCGGGG
3081	GAAGAACGTT	TTCCAATGAT	GAGCACTTTT	AAAGTTCTGC	TATGTGGCGC	GGTATTATCC	CGTATTGACG
	CTTCTTGCAA	AAGGTTACTA	CTCGTGAAAA	TTTCAAGACG	ATACACCGCG	CCATAATAGG	GCATAACTGC
3151	CCGGGCAAGA	GCAACTCGGT CGTTGAGCCA	CGCCGCATAC GCGGCGTATG	ACTATTCTCA TGATAAGAGT	GAATGACTTG CTTACTGAAC	GTTGAGTACT CAACTCATGA	CACCAGTCAC GTGGTCAGTG
3221	AGAAAAGCAT	CTTACGGATG	GCATGACAGT	AAGAGAATTA	TGCAGTGCTG	CCATAACCAT	GAGTGATAAC
	TCTTTTCGTA	GAATGCCTAC	CGTACTGTCA	TTCTCTTAAT	ACGTCACGAC	GGTATTGGTA	CTCACTATTG
3291	ACTGCGGCCA	ACTTACTTCT	GACAACGATC	GGAGGACCGA	AGGAGCTAAC	CGCTTTTTTG	CACAACATGG
	TGACGCCGGT	TGAATGAAGA	CTGTTGCTAG	CCTCCTGGCT	TCCTCGATTG	GCGAAAAAAC	GTGTTGTACC
3361	GGGATCATGT	AACTCGCCTT	GATCGTTGGG	AACCGGAGCT	GAATGAAGCC	ATACCAAACG	ACGAGCGTGA
	CCCTAGTACA	TTGAGCGGAA	CTAGCAACCC	TTGGCCTCGA	CTTACTTCGG	TATGGTTTGC	TGCTCGCACT
3431	CACCACGATG	CCTGTAGCAA	TGGCAACAAC	GTTGCGCAAA	CTATTAACTG	GCGAACTACT	TACTCTAGCT
	GTGGTGCTAC	GGACATCGTT	ACCGTTGTTG	CAACGCGTTT	GATAATTGAC	CGCTTGATGA	ATGAGATCGA
3501	TCCCGGCAAC	AATTAATAGA	CTGGATGGAG	GCGGATAAAG	TTGCAGGACC	ACTTCTGCGC	TCGGCCCTTC
	AGGGCCGTTG	TTAATTATCT	GACCTACCTC	CGCCTATTTC	AACGTCCTGG	TGAAGACGCG	AGCCGGGAAG

## FIG._44F

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Target Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 114 of 154

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3571	CGGCTGGCTG	GTTTATTGCT CAAATAACGA	GATAAATCTG CTATTTAGAC	GAGCCGGTGA CTCGGCCACT	GCGTGGGTCT CGCACCCAGA	CGCGGTATCA GCGCCATAGT	TTGCAGCACT AACGTCGTGA
3641	GGGGCCAGAT	GGTAAGCCCT	CCCGTATCGT	AGTTATCTAC	ACGACGGGGA	GTCAGGCAAC	TATGGATGAA
	CCCCGGTCTA	CCATTCGGGA	GGGCATAGCA	TCAATAGATG	TGCTGCCCCT	CAGTCCGTTG	ATACCTACTT
3711	CGAAATAGAC	AGATCGCTGA	GATAGGTGCC	TCACTGATTA	AGCATTGGTA	ACTGTCAGAC	CAAGTTTACT
	GCTTTATCTG	TCTAGCGACT	CTATCCACGG	AGTGACTAAT	TCGTAACCAT	TGACAGTCTG	GTTCAAATGA
3781	CATATATACT	TTAGATTGAT	TTAAAACTTC	ATTTTTAATT	TAAAAGGATC	TAGGTGAAGA	TCCTTTTGA
	GTATATATGA	AATCTAACTA	AATTTTGAAG	TAAAAATTAA	ATTTTCCTAG	ATCCACTTCT	AGGAAAACT
3851	TAATCTCATG	ACCAAAATCC	CTTAACGTGA	GTTTTCGTTC	CACTGAGCGT	CAGACCCCGT	AGAAAAGATC
	ATTAGAGTAC	TGGTTTTAGG	GAATTGCACT	CAAAAGCAAG	GTGACTCGCA	GTCTGGGGCA	TCTTTTCTAG
3921	AAAGGATCTT	CTTGAGATCC	TTTTTTCTG	CGCGTAATCT	GCTGCTTGCA	AACAAAAAA	CCACCGCTAC
	TTTCCTAGAA	GAACTCTAGG	AAAAAAAGAC	GCGCATTAGA	CGACGAACGT	TTGTTTTTT	GGTGGCGATG
3991	CAGCGGTGGT	TTGTTTGCCG	GATCAAGAGC	TACCAACTCT	TTTTCCGAAG	GTAACTGGCT	TCAGCAGAGC
	GTCGCCACCA	AACAAACGGC	CTAGTTCTCG	ATGGTTGAGA	AAAAGGCTTC	CATTGACCGA	AGTCGTCTCG
4061	GCAGATACCA	AATACTGTCC	TTCTAGTGTA	GCCGTAGTTA	GGCCACCACT	TCAAGAACTC	TGTAGCACCG
	CGTCTATGGT	TTATGACAGG	AAGATCACAT	CGGCATCAAT	CCGGTGGTGA	AGTTCTTGAG	ACATCGTGGC
4131	CCTACATACC GGATGTATGG	TCGCTCTGCT AGCGAGACGA	AATCCTGTTA TTAGGACAAT	CCAGTGGCTG GGTCACCGAC	CTGCCAGTGG	CGATAAGTCG GCTATTCAGC	TGTCTTACCG ACAGAATGGC
4201	GGTTGGACTC	AAGACGATAG TTCTGCTATC	TTACCGGATA AATGGCCTAT	AGGCGCAGCG TCCGCGTCGC	GTCGGGCTGA	ACGGGGGGGTT TGCCCCCCAA	CGTGCACACA GCACGTGTGT
4271	GCCCAGCTTG	GAGCGAACGA CTCGCTTGCT	CCTACACCGA GGATGTGGCT	ACTGAGATAC TGACTCTATG	CTACAGCGTG GATGTCGCAC	AGCTATGAGA TCGATACTCT	AAGCGCCACG TTCGCGGTGC
4341	CTTCCCGAAG GAAGGGCTTC	GGAGAAAGGC CCTCTTTCCG	GGACAGGTAT CCTGTCCATA	CCGGTAAGCG GGCCATTCGC	GCAGGGTCGG	AACAGGAGAG TTGTCCTCTC	CGCACGAGGG

# FIG._44G

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls of Plant Cell Walls of Expression of Genes Encoding Cell Wall. SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 115 of 154

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4411	AGCTTCCAGG GGG TCGAAGGTCC CCC	AGCTTCCAGG GGGAAACGCC TGGTATCTTT TCGAAGGTCC CCCTTTGCGG ACCATAGAAA	TGGTATCTTT ACCATAGAAA	ATAGTCCTGT TATCAGGACA	CGGGTTTCGC CACCTCTGAC GCCCAAAGCG GTGGAGACTG	CACCTCTGAC GTGGAGACTG	<b>TTGAGCGTCG</b> AACTCGCAGC
4481	ATTTTGTGA TGC TAAAAACACT ACG	TGCTCGTCAG	GGGGGCGGAG	CCTATGGAAA GGATACCTTT	AACGCCAGCA ACGCGGCCTT TTGCGGTCGT TGCGCCGGAA	ACGCGGCCTT TGCGCCGGAA	TTTACGGTTC AAATGCCAAG
4551	CTGGCCTTTT GACCGGAAAA	GCTGGCCTTT	TGCTCACATG ACGAGTGTAC	TTCTTTCCTG AAGAAAGGAC	CGTTATCCCC TGATTCTGTG GCAATAGGGG ACTAAGACAC	TGATTCTGTG ACTAAGACAC	GATAACCGTA CTATTGGCAT
4621	TTACCGCCTT TGA AATGGCGGAA ACT	TGAGTGAGCT ACTCACTCGA	GATACCGCTC GCCGCAGCCG CTATGGCGAG CGGCGTCGGC		AACGACCGAG CGCAGCGAGT TTGCTGGCTC GCGTCGCTCA	CGCAGCGAGT GCGTCGCTCA	CAGTGAGCGA GTCACTCGCT
4691	GGAAGCGGAA GAG CCTTCGCCTT CTC	GAGCGCCCAA	TACGCAAACC GCCTCTCCCC ATGCGTTTGG CGGAGAGGGG		GCGCGTTGGC CGATTCATTA CGCGCAACCG GCTAAGTAAT	CGATTCATTA GCTAAGTAAT	ATGCAGCTGG TACGTCGACC
4761	CACGACAGGT TTC GTGCTGTCCA AAG	TTCCCGACTG AAGGGCTGAC		GAAAGCGGGC AGTGAGCGCA ACGCAATTAA CTTTCGCCCG TCACTCGCGT TGCGTTAATT	ACGCAATTAA TGCGTTAATT	TGTGAGTTAG CTCACTCATT ACACTCAATC GAGTGAGTAA	CTCACTCATT GAGTGAGTAA
4831	AGGCACCCCA GGC TCCGTGGGGT CCG	GGCTTTACAC CCGAAATGTG	TTTATGCTTC AAATACGAAG	CGGCTCGTAT GCCGAGCATA	GTTGTGTGGA	ATTGTGAGCG TAACACTCGC	GATAACAATT CTATTGTTAA
				BSSHII	H		
4901	TCACACAGGA	TCACACAGGA AACAGCTATG AGTGTCCT TTGTCGATAC	ACCATGATTA TGGTACTAAT	CGCCAAGCGC GCGGTTCGCG	CGCCAAGCGC GCAATTAACC CTCACTAAAG GCGGTTCGCG CGTTAATTGG GAGTGATTTC		GGAACAAAAG CCTTGTTTTC

FIG._44H

CTGG GACC

4971

EcoR

"Manipulation of the Phenolic Acid Contented Digestibility of Plant Cell Walls of Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 116 of 154

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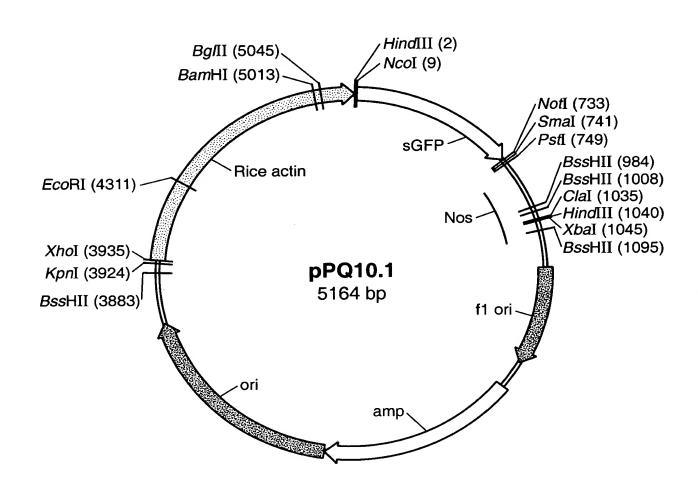


FIG._45A

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls of Targets Expression of Genes Encoding Cell Wall. SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 117 of 154

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Ħ	AAGCTTACCA TG TTCGAATGGT AC	TGGTGAGCAA	GGGCGAGGAG CCCGCTCCTC	CTGTTCACCG GACAAGTGGC	GGGTGGTGCC CCCACCACGG	CATCCTGGTC GTAGGACCAG	GAGCTGGACG CTCGACCTGC
71	GCGACGTGAA CG CGCTGCACTT GC	CGGCCACAAG GCCGGTGTTC	TTCAGCGTGT AAGTCGCACA	CCGGCGAGGG	CGAGGGCGAT GCTCCCGCTA	GCCACCTACG CGGTGGATGC	GCAAGCTGAC CGTTCGACTG
141	CCTGAAGTTC GGACTTCAAG	ATCTGCACCA TAGACGTGGT	CCGGCAAGCT GGCCGTTCGA	GCCCGTGCCC	TGGCCCACCC	TCGTGACCAC AGCACTGGTG	CTTCACCTAC GAAGTGGATG
211	GGCGTGCAGT GC CCGCACGTCA CG	GCTTCAGCCG CGAAGTCGGC	CTACCCCGAC GATGGGGCTG	CACATGAAGC GTGTACTTCG	AGCACGACTT TCGTGCTGAA	CTTCAAGTCC GAAGTTCAGG	GCCATGCCCG CGGTACGGGC
281	AAGGCTACGT CC TTCCGATGCA GG	CCAGGAGCGC GGTCCTCGCG	ACCATCTTCT TGGTAGAAGA	TCAAGGACGA AGTTCCTGCT	CGGCAACTAC GCCGTTGATG	AAGACCCGCG TTCTGGGCGC	CCGAGGTGAA GGCTCCACTT
351	GTTCGAGGGC CAAGCTCCCG	GACACCCTGG CTGTGGGACC	TGAACCGCAT ACTTGGCGTA	CGAGCTGAAG GCTCGACTTC	GGCATCGACT CCGTAGCTGA	TCAAGGAGGA AGTTCCTCCT	CGGCAACATC GCCGTTGTAG
421	CTGGGGCACA AG GACCCCGTGT TC	AGCTGGAGTA TCGACCTCAT	CAACTACAAC GTTGATGTTG	AGCCACAACG TCGGTGTTGC	TCTATATCAT AGATATAGTA	GGCCGACAAG CCGGCTGTTC	CAGAAGAACG GTCTTCTTGC
491	GCATCAAGGT	GAACTTCAAG CTTGAAGTTC	ATCCGCCACA TAGGCGGTGT	ACATCGAGGA TGTAGCTCCT	CGGCAGCGTG GCCGTCGCAC	CAGCTCGCCG GTCGAGCGGC	ACCACTACCA TGGTGATGGT
561	GCAGAACACC CC CGTCTTGTGG GG	CCCATCGGCG	ACGGCCCCGT	GCTGCTGCCC	GACAACCACT CTGTTGGTGA	ACCTGAGCAC TGGACTCGTG	CCAGTCCGCC
631	CTGAGCAAAG GACTCGTTTC	CTGAGCAAAG ACCCCAACGA GACTCGTTTC TGGGGTTGCT	GAAGCGCGAT	CACATGGTCC GTGTACCAGG	TGCTGGAGTT ACGACCTCAA	CGTGACCGCC GCACTGGCGG	GCCGGGATCA CGGCCCTAGT

HindIII Ncol

# FIG._45B

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls Parget Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 118 of 154

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Smal ..... PstI

111111

		Beshil					
GCTTCTAGAG		CTATGTTACT	GCGGTGTCAT	ATTATCGCGC GC	ACTAGGATAA	TAGCGCGCAA ACTA	
ıdııı	Clar Hindili		H	BSSHII		BSSHII	
5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5							
XbaI							
AAACAAAATA TTTGTTTTAT	TTTTTA TGATTAGAGT CCCGCAATTA TACATTTAAT ACGCGATAGA AAACAAATA AAAAAT ACTAATCTCA GGGCGTTAAT ATGTAAATTA TGCGCTATCT TTTGTTTTAT	TACATTTAAT ATGTAAATTA	CCCGCAATTA GGGCGTTAAT	TGATTAGAGT ACTAATCTCA	ATTTATGAGA TGGGTTTTTA TAAATACTCT ACCCAAAAAT	ATTTATGAGA TGGG TAAATACTCT ACCC	
CGTACTGCAA	TTGTACATTA	ACATTATTAA	TGCAATTCGT	GCTACTAATA GTATATTAAA GACAACTTAA TGCAATTCGT ACATTATTAA	GTATATTAAA	GCTACTAATA	
GCATGACGTT	CGATGATTAT CATATATT CTGTTGAATT ACGTTAAGCA TGTAATAATT AACATGTAAT GCATGACGTT	TGTAATAATT	ACGTTAAGCA	CTGTTGAATT	CATATAATTT	CGATGATTAT	841
CGGCCAGAAC	CTTAGGACAA CGGCCAGAAC	AGAATTCTAA	TTTGTAAACC GTTATTTCAA AGAATTCTAA	TTTGTAAACC	GTCTAGCAAG	ACATTTCTTC	
GCCGGTCTTG	TGTAAAGAAG CAGATCGTTC AAACATTTGG CAATAAAGTT TCTTAAGATT GAATCCTGTT GCCGGTCTTG	TCTTAAGATT	CAATAAAGTT	AAACATTTGG	CAGATCGTTC	TGTAAAGAAG	
TTCCTACTCG	CTTTGGTGAC TTCCTACTCG	CGCCGGCGGG CCCGACGTCC		ATGTTCATTT	CCTGCTCGAC	GAGTGCCGTA	
AAGGATGAGC	CTCACGGCAT GGACGAGCTG TACAAGTAAA GCGGCCGCCC GGGCTGCAGG GAAACCACTG AAGGATGAGC	GGGCTGCAGG	ರಿದಿರಿದಿರುವಿ	TACAAGTAAA	GGACGAGCTG	CTCACGGCAT	

# GGCGTAATAG CGAAGAGGCC CGCACCGATC GCCCTTCCCA ACAGTTGCGC AGCCTGAATG GCGAATGGGA CCGCATTATC GCTTCTCCGG GCGTGGCTAG CGGGAAGGGT TGTCAACGCG TCGGACTTAC CGCTTACCCT FIG._45C

CGTCGTGACT GGGAAAACCC TGGCGTTACC CAACTTAATC GCCTTGCAGC ACATCCCCCT TTCGCCAGCT GCAGCACTGA CCCTTTTGGG ACCGCAATGG GTTGAATTAG CGGAACGTCG TGTAGGGGGA AAGCGGTCGA

CGGCCGGTGG AGCTCCAATT CGCCCTATAG TGAGTCGTAT TACGCGCGCT CACTGGCCGT CGTTTTACAA

22222

GCCGGCCACC TCGAGGTTAA GCGGGATATC ACTCAGCATA ATGCGCGCGA

1051

1121

1191

GTGACCGGCA GCAAAATGTT

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Jarge Expression of Genes Encoding Cell Wall. SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 119 of 154

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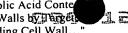
TACACTTGCC ATGTGAACGG	TTTCCCCGTC AAAGGGGCAG	CCAAAAAACT GGTTTTTTGA	GACGTTGGAG CTGCAACCTC	GTCTATTCTT CAGATAGAA	AAAATTTAA TTTTTAAATT	CGCGGAACCC	GATAAATGCT CTATTTACGA	CTTTTTTGCG GAAAAAACGC	GATCAGTTGG CTAGTCAACC	GCCCCGAAGA	TGACGCCGGG ACTGCGGCCC
GCGTGACCGC	GTTCGCCGGC	CACCTCGACC GTGGAGCTGG	TTCGCCCTTT AAGCGGGAAA	CCCTATCTCG GGGATAGAGC	CTGATTTAAC GACTAAATTG	GGGAAATGTG CCCTTTACAC	CAATAACCCT GTTATTGGGA	CCCTTATTCC GGGAATAAGG	AGATGCTGAA TCTACGACTT	GAGAGTTTTC CTCTCAAAAG	TATCCCGTAT ATAGGGCATA
GTTACGCGCA CAATGCGCGT	TTCTCGCCAC AAGAGCGGTG	TGCTTTACGG ACGAAATGCC	TAGACGGTTT ATCTGCCAAA	CAACACTCAA GTTGTGAGTT	AAAAAATGAG TTTTTTACTC	GCACTTTTCG CGTGAAAAGC	GCTCATGAGA CGAGTACTCT	TTCCGTGTCG AAGGCACAGC	TGAAAGTAAA ACTTTCATTT	TAAGATCCTT ATTCTAGGAA	GGCGCGGTAT
GGGTGTGGTG CCCACACCAC	TTCCCTTCCT AAGGGAAGGA	TCCGATTTAG AGGCTAAATC	ATCGCCCTGA TAGCGGGACT	CAAACTGGAA GTTTGACCTT	CCTATTGGTT GGATAACCAA	AATTTAGGTG TTAAATCCAC	ATATGTATCC TATACATAGG	TATTCAACAT ATAAGTTGTA	GAAACGCTGG CTTTGCGACC	TCAACAGCGG AGTTGTCGCC	TCTGCTATGT AGACGATACA
TAAGCGCGGC ATTCGCGCCG	TTTCGCTTTC AAAGCGAAAG	CCTTTAGGGT GGAAATCCCA	GTAGTGGGCC CATCACCCGG	ACTCTTGTTC TGAGAACAAG	CCGATTTCGG GGCTAAAGCC	TAACGCTTAC ATTGCGAATG	ATACATTCAA TATGTAAGTT	AGAGTATGAG TCTCATACTC	TGCTCACCCA	GAACTGGATC	CTTTTAAAGT GAAAATTTCA
AGCGGCGCAT	CGCCCGCTCC	TCGGGGGCTC	GATGGTTCAC CTACCAAGTG	TTAATAGTGG AATTATCACC	AGGGATTTTG TCCCTAAAAC	AACAAAATAT TTGTTTTATA	ATTTTTCTAA TAAAAAGATT	TGAAAAAGGA ACTTTTTCCT	TTCCTGTTTT AAGGACAAAA	GGGTTACATC CCCAATGTAG	ATGATGAGCA TACTACTCGT
CGCGCCCTGT	AGCGCCCTAG TCGCGGGATC	AAGCTCTAAA TTCGAGATTT	TGATTAGGGT ACTAATCCCA	TCCACGTTCT AGGTGCAAGA	TTGATTTATA AACTAAATAT	CGCGAATTTT GCGCTTAAAA	CTATTTGTTT GATAAACAAA	TCAATAATAT AGTTATTATA	GCATTTTGCC CGTAAAACGG	GTGCACGAGT CACGTGCTCA	ACGTTTTCCA TGCAAAAGGT
1261	1331	1401	1471	1541	1611	1681	1751	1821	1891	1961	2031

# FIG._45D

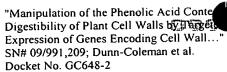
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A GTCACAGAAA	G ATAACACTGC	A CATGGGGGAT	AG CGTGACACCA	rc tagcttcccg	SC CCTTCCGGCT	CA GCACTGGGGC	GG ATGAACGAAA	GT TTACTCATAT	TT TTTGATAATC	AA AGATCAAAGG	CC GCTACCAGCG
FT CAGTGTCTTT	IC TATTGTGACG	IT GTACCCCCTA	IC GCACTGTGGT	ag atcgaaggc		ST CGTGACCCCG	CC TACTTGCTTT	CA AATGAGTATA	AA AAACTATTAG	TT TCTAGTTTCC	GG CGATGGTCGC
GTACTCACCA	ACCATGAGTG	TTTTGCACAA	AAACGACGAG	CTACTTACTC	TGCGCTCGGC	TATCATTGCA	GCAACTATGG	CAGACCAAGT	GAAGATCCTT	CCCGTAGAAA	AAAAACCACC
CATGAGTGGT	TGGTACTCAC	AAAACGTGTT	TTTGCTGCTC	GATGAATGAG		ATAGTAACGT	CGTTGATACC	GTCTGGTTCA	CTTCTAGGAA	GGGCATCTTT	TTTTTGGTGG
ACTTGGTTGA	TGCTGCCATA	CTAACCGCTT	AAGCCATACC	AACTGGCGAA	GGACCACTTC	GGTCTCGCGG	GGGGAGTCAG	TGGTAACTGT	GGATCTAGGT	AGCGTCAGAC	TTGCAAACAA
TGAACCAACT	ACGACGGTAT	GATTGGCGAA	TTCGGTATGG	TTGACCGCTT	CCTGGTGAAG	CCAGAGCGCC	CCCCTCAGTC	ACCATTGACA	CCTAGATCCA	TCGCAGTCTG	AACGTTTGTT
TCTCAGAATG	AATTATGCAG	ACCGAAGGAG	GAGCTGAATG	GCAAACTATT	TAAAGTTGCA	GGTGAGCGTG	TCTACACGAC	GATTAAGCAT	TAATTTAAAA	CGTTCCACTG	AATCTGCTGC
AGAGTCTTAC	TTAATACGTC	TGGCTTCCTC	CTCGACTTAC	CGTTTGATAA	ATTTCAACGT	CCACTCGCAC	AGATGTGCTG	CTAATTCGTA	ATTAAATTTT	GCAAGGTGAC	TTAGACGACG
CATACACTAT	ACAGTAAGAG	CGATCGGAGG	TTGGGAACCG	ACAACGTTGC	TGGAGGCGGA	ATCTGGAGCC	ATCGTAGTTA	GTGCCTCACT	ACTTCATTTT	CGTGAGTTTT	TTCTGCGCGT
GTATGTGATA	TGTCATTCTC	GCTAGCCTCC	AACCCTTGGC	TGTTGCAACG	ACCTCCGCCT	TAGACCTCGG	TAGCATCAAT		TGAAGTAAAA	GCACTCAAAA	AAGACGCGCA
TCGGTCGCCG	GGATGGCATG	CTTCTGACAA	GCCTTGATCG	AGCAATGGCA	ATAGACTGGA	TTGCTGATAA	GCCCTCCCGT	GCTGAGATAG	TTGATTTAAA	AATCCCTTAA	GATCCTTTTT
AGCCAGCGGC	CCTACCGTAC	GAAGACTGTT	CGGAACTAGC	TCGTTACCGT	TATCTGACCT	AACGACTATT	CGGGAGGGCA	CGACTCTATC	AACTAAATTT	TTAGGGAATT	CTAGGAAAAA
CAAGAGCAAC	AGCATCTTAC	GGCCAACTTA	CATGTAACTC	CGATGCCTGT	GCAACAATTA	GGCTGGTTTA	CAGATGGTAA	TAGACAGATC	ATACTTTAGA	TCATGACCAA	ATCTTCTTGA
GTTCTCGTTG	TCGTAGAATG	CCGGTTGAAT	GTACATTGAG	GCTACGGACA	CGTTGTTAAT	CCGACCAAAT	GTCTACCATT	ATCTGTCTAG	TATGAAATCT	AGTACTGGTT	TAGAAGAACT
2101	2171	2241	2311	2381	2451	2521	2591	2661	2731	2801	2871

## FIG._ 45E



1509.020505



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2941	GTGGTTTGTT CACCAAACAA	TGCCGGATCA ACGGCCTAGT	AGAGCTACCA TCTCGATGGT	ACTCTTTTTC TGAGAAAAAG	CGAAGGTAAC GCTTCCATTG	TGGCTTCAGC ACCGAAGTCG	AGAGCGCAGA TCTCGCGTCT
3011	TACCAAATAC ATGGTTTATG	TGTCCTTCTA ACAGGAAGAT	GTGTAGCCGT CACATCGGCA	<b>AGTTAGGCCA</b> TCAATCCGGT	CCACTTCAAG GGTGAAGTTC	AACTCTGTAG TTGAGACATC	CACCGCCTAC GTGGCGGATG
3081	ATACCTCGCT TATGGAGCGA	CTGCTAATCC GACGATTAGG	TGTTACCAGT ACAATGGTCA	GGCTGCTGCC	AGTGGCGATA TCACCGCTAT	AGTCGTGTCT TCAGCACAGA	TACCGGGTTG ATGGCCCAAC
3151	GACTCAAGAC CTGAGTTCTG	GATAGTTACC CTATCAATGG	GGATAAGGCG CCTATTCCGC	CAGCGGTCGG GTCGCCAGCC	GCTGAACGGG	GGGTTCGTGC	ACACAGCCCA TGTGTCGGGT
3221	GCTTGGAGCG CGAACCTCGC	AACGACCTAC TTGCTGGATG	ACCGAACTGA TGGCTTGACT	GATACCTACA CTATGGATGT	GCGTGAGCTA	TGAGAAAGCG ACTCTTTCGC	CCACGCTTCC GGTGCGAAGG
3291	CGAAGGGAGA GCTTCCCTCT	AAGGCGGACA TTCCGCCTGT	GGTATCCGGT CCATAGGCCA	AAGCGGCAGG TTCGCCGTCC	GTCGGAACAG	GAGAGCGCAC	GAGGGAGCTT CTCCCTCGAA
3361	CCAGGGGGAA GGTCCCCCTT	ACGCCTGGTA TGCGGACCAT	TCTTTATAGT AGAAATATCA	CCTGTCGGGT	TTCGCCACCT AAGCGGTGGA	CTGACTTGAG GACTGAACTC	CGTCGATTTT GCAGCTAAAA
3431	TGTGATGCTC ACACTACGAG	GTCAGGGGGG	CGGAGCCTAT GCCTCGGATA	GGAAAAACGC CCTTTTTGCG	CAGCAACGCG GTCGTTGCGC	GCCTTTTTAC CGGAAAAATG	GGTTCCTGGC CCAAGGACCG
3501	CTTTTGCTGG GAAAACGACC	CCTTTTGCTC GGAAAACGAG	ACATGTTCTT TGTACAAGAA	TCCTGCGTTA AGGACGCAAT	TCCCCTGATT AGGGGACTAA	CTGTGGATAA GACACCTATT	CCGTATTACC GGCATAATGG
3571	GCCTTTGAGT CGGAAACTCA	GAGCTGATAC	CGCTCGCCGC	AGCCGAACGA TCGGCTTGCT	CCGAGCGCAG GGCTCGCGTC	CGAGTCAGTG GCTCAGTCAC	AGCGAGGAAG TCGCTCCTTC
3641	CGGAAGAGCG GCCTTCTCGC	CCCAATACGC	AAACCGCCTC TTTGGCGGAG	TCCCCGCGCG	TTGGCCGATT AACCGGCTAA	CATTAATGCA GTAATTACGT	GCTGGCACGA
3711	CAGGTTTCCC GTCCAAAGGG	GACTGGAAAG CTGACCTTTC	CGGGCAGTGA GCCCGTCACT	GCGCAACGCA CGCGTTGCGT	ATTAATGTGA TAATTACACT	GTTAGCTCAC CAATCGAGTG	TCATTAGGCA AGTAATCCGT

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Target Expression of Genes Encoding Cell Walls SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 122 of 154

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3781	CCCCAGGCTT GGGGTCCGAA	TACACTTTAT ATGTGAAATA	GCTTCCGGCT	CGTATGTTGT GCATACAACA	GTGGAATTGT CACCTTAACA	GAGCGGATAA CTCGCCTATT	CAATTTCACA GTTAAAGTGT
3851	CAGGAAACAG GTCCTTTGTC	CTATGACCAT GATACTGGTA	GATTACGCCA CTAATGCGGT	Bsshii ~~~~~~ AGCGCGCAAT TCGCGCGTTA	TAACCCTCAC ATTGGGAGTG	TAAAGGGAAC ATTTCCCTTG	Kpni Ž AAAAGCTGGG TTTTCGACCC
3921	KpnI ~~~ TACCGGCCC ATGGCCCGGG	Xhol ~~~~~ CCCCTCGAGG GGGGAGCTCC	TCATTCATAT AGTAAGTATA	GCTTGAGAAG CGAACTCTTC	AGAGTCGGGA TCTCAGCCCT	TAGTCCAAAA ATCAGGTTTT	TAAAACAAAG ATTTTGTTTC
3991	GTAAGATTAC CATTCTAATG	CTGGTCAAAA GACCAGTTTT	GTGAAAACAT CACTTTTGTA	CAGTTAAAAG GTCAATTTTC	GTGGTATAAG CACCATATTC	TAAAATATCG ATTTTATAGC	GTAATAAAAG CATTATTTTC
4061	GTGGCCCAAA	GTGAAATTTA CACTTTAAAT	CTCTTTTCTA GAGAAAAGAT	CTATTATAAA GATAATATTT	AATTGAGGAT TTAACTCCTA	GTTTTGTCGG CAAAACAGCC	TACTTTGATA ATGAAACTAT
4131	CGTCATTTT GCAGTAAAAA	GTATGAATTG CATACTTAAC	GTTTTTAAGT CAAAAATTCA	TTATTCGCGA AATAAGCGCT	TTTGGAAATG AAACCTTTAC	CATATCTGTA GTATAGACAT	TTTGAGTCGG AAACTCAGCC
4201	TTTTTAAGTT AAAAATTCAA	CGTTGCTTTT GCAACGAAAA	GTAAATACAG CATTTATGTC	AGGGATTTGT TCCCTAAACA	ATAAGAAATA TATTCTTTAT	TCTTTAAAAA AGAAATTTTT	ACCCATATGC TGGGTATACG
4271	TAATTTGACA ATTAAACTGT	TAATTTTGA ATTAAAAACT	GAAAAATATA CTTTTTATAT	TATTCAGGCG ATAAGTCCGC	ECORI ~~~~~~ AATTCCACAA TTAAGGTGTT	TGAACAATAA ACTTGTTATT	TAAGATTAAA ATTCTAATTT
4341	ATAGCTTGCC TATCGAACGG	CCCGTTGCAG GGGCAACGTC	CGATGGGTAT GCTACCCATA	TTTTTCTAGT AAAAAGATCA	AAAATAAAAG TTTTATTTTC	ATAAACTTAG TATTTGAATC	ACTCAAAACA TGAGTTTTGT
4411	TTTACAAAAA AAATGTTTTT	CAACCCCTAA GTTGGGGATT	AGTCCTAAAG TCAGGATTTC	CCCAAAGTGC GGGTTTCACG	TATGCACGAT ATACGTGCTA	CCATAGCAAG	CCCAGCCCAA

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls of Falgete Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 123 of 154

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4481	CCCAACCCAA CC GGGTTGGGTT GG	CCCAACCCAC GGGTTGGGTG	CCCAGTGCAG GGGTCACGTC	CCAACTGGCA GGTTGACCGT	AATAGTCTCC	ACCCCCGGCA TGGGGGCCGT	CTATCACCGT GATAGTGGCA
4551	GAGTTGTCCG CACCACCGCA CTCAACAGGC GTGGTGGCGT	CACCACCGCA	CGTCTCGCAG GCAGAGCGTC	CCAAAAAAA GGTTTTTTT	AAAAAGAAAG TTTTTCTTTC	AAAAAAAAGA TTTTTTTCT	AAAAGAAAAA TTTTCTTTTT
4621	CAGCAGGTGG GTCGTCCACC	CAGCAGGTGG GTCCGGGTCG GTCGTCCACC CAGGCCCAGC	TGGGGGCCGG	AAAAGCGAGG TTTTCGCTCC	AGGATCGCGA TCCTAGCGCT	GCAGCGACGA	<u> </u>
4691	TCCCTCCGCT TCCAAAGAAA AGGGAGGCGA AGGTTTCTTT	TCCCTCCGCT TCCAAAGAAA AGGGAGGCGA AGGTTTCTTT	CGCCCCCCAT	CGCCACTATA GCGGTGATAT	TACATACCCC ATGTATGGGG	CCCCTCTCCT	CCCATCCCCC
4761	CAACCCTACC GTTGGGATGG	CAACCCTACC ACCACCACCA GTTGGGATGG TGGTGGTGGT	CCACCACCTC GGTGGTGGAG	CTCCCCCTC	GCTGCCGGAC	GACGAGCTCC CTGCTCGAGG	TCCCCCTCC AGGGGGGAGG
4831	CCCTCCGCCG	CCCTCCGCCG CCGCCGGTAA GGGAGGCGGC GGCGGCCATT	CCACCCGCC	CCTCTCCTCT	TTCTTTCTCC AAGAAAGAGG	GTTTTTTTT CAAAAAAAA	TCGTCTCGGT AGCAGAGCCA
4901	CTCGATCTTT GAGCTAGAAA	CTCGATCTTT GGCCTTGGTA GAGCTAGAAA CCGGAACCAT	GTTTGGGTGG CAAACCCACC	GCGAGAGCGG	CTTCGTCGCC GAAGCAGCGG	CAGATCGGTG GTCTAGCCAC	CGCGGGAGGG
4971	GCGGGATCTC GC CGCCCTAGAG CG	GCGGCTGGCG	TCTCCGGGCG	TGAGTCGGCC ACTCAGCCGG	BamHI CGGATCCTCG GCCTAGGAGC	CGGGGAATGG GCCCCTTACC	GGCTCTCGGA CCGAGAGCCT
5041	Bglii ~~~~~ TGTAGATCTT CT ACATCTAGAA GA	CTTTCTTTCT GAAAGAAAGA	TCTTTTTGTG AGAAAAACAC	GTAGAATTTG CATCTTAAAC	AATCCCTCAG TTAGGGAGTC	CATTGTTCAT GTAACAAGTA	CGGTAGTTTT GCCATCAAAA

# FIG._45H

GTAG CATC

TCTTTTCATG ATTTGTGACA AATGCAGCCT CGTGCGGAGC TTTTTTGTAG AGAAAAGTAC TAAACACTGT TTACGTCGGA GCACGCCTCG AAAAAACATC

5111

"Manipulation of the Phenolic Acid Content applies the Phenolic Acid Conte

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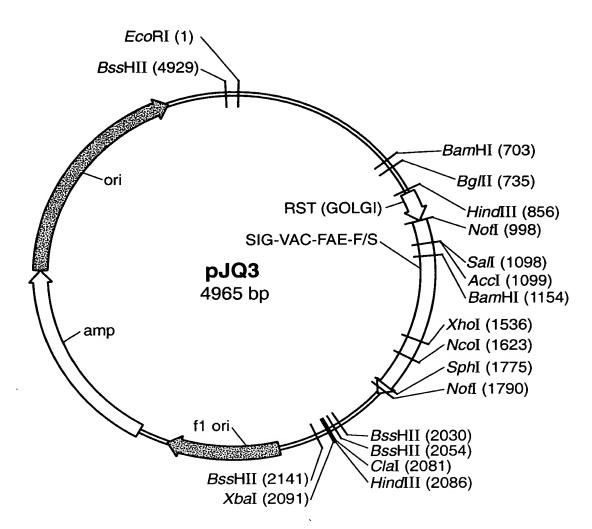


FIG._46A

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Talgeton Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 125 of 154

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ਜ	AATTCCACAA TTAAGGTGTT	TGAACAATAA ACTTGTTATT	TAAGATTAAA ATTCTAATTT	ATAGCTTGCC TATCGAACGG	CCCGTTGCAG GGGCAACGTC	CGATGGGTAT GCTACCCATA	TTTTTCTAGT AAAAAGATCA
71	AAAATAAAG TTTTATTTTC	ATAAACTTAG TATTTGAATC	ACTCAAAACA TGAGTTTTGT	TTTACAAAAA AAATGTTTTT	CAACCCCTAA GTTGGGGATT	AGTCCTAAAG TCAGGATTTC	CCCAAAGTGC GGGTTTCACG
141	TATGCACGAT ATACGTGCTA	CCATAGCAAG GGTATCGTTC	CCCAGCCCAA GGGTCGGGTT	CCCAACCCAA GGGTTGGGTT	CCCAACCCAC	CCCAGTGCAG GGGTCACGTC	CCAACTGGCA GGTTGACCGT
211	AATAGTCTCC TTATCAGAGG	ACCCCCGGCA TGGGGGCCGT	CTATCACCGT GATAGTGGCA	GAGTTGTCCG CTCAACAGGC	CACCACCGCA GTGGTGGCGT	CGTCTCGCAG GCAGAGCGTC	CCAAAAAAA GGTTTTTTT
281	AAAAAGAAAG TTTTCTTTC	aaaaaaaga tttttttct	AAAAGAAAA TTTTCTTTTT	CAGCAGGTGG GTCGTCCACC	GTCCGGGTCG	TGGGGGCCGG ACCCCCGGCC	aaaagcgagg ttttcgctcc
351	AGGATCGCGA TCCTAGCGCT	GCAGCGACGA	ອອອວວອອອວວ ວວວອອວວວອອ	TCCCTCCGCT AGGGAGGCGA	TCCAAAGAAA AGGTTTCTTT	CGCCCCCCAT	CGCCACTATA GCGGTGATAT
421	TACATACCCC ATGTATGGGG	CCCCTCTCCT	CCCATCCCCC	CAACCCTACC GTTGGGATGG	ACCACCACCA TGGTGGTGGT	CCACCACCTC	CTCCCCCTC
491	GCTGCCGGAC	GACGAGCTCC CTGCTCGAGG	TCCCCCCTCC	CCCTCCGCCG	CCGCCGGTAA	CCACCCCGC	CCTCTCCTCT GGAGAGGAGA
561	TTCTTTCTCC AAGAAAGAGG	GTTTTTTTT CAAAAAAAA	TCGTCTCGGT AGCAGAGCCA	CTCGATCTTT GAGCTAGAAA	GGCCTTGGTA CCGGAACCAT	GTTTGGGTGG CAAACCCACC	GCGAGAGCGG CGCTCTCGCC
631	CTTCGTCGCC GAAGCAGCGG	CAGATCGGTG GTCTAGCCAC	CGCGGGAGGG	GCGGGATCTC CGCCCTAGAG	GCGGCTGGCG	TCTCCGGGCG AGAGGCCCGC	TGAGTCGGCC
	BamHI			Bglii			
701	CGGATCCTCG	CGGGGAATGG GCCCCTTACC	GGCTCTCGGA	TGTAGATCTT ACATCTAGAA	CTTTCTTTCT GAAAGAAAGA	TCTTTTTGTG AGAAAAACAC	GTAGAATTTG CATCTTAAAC

ECORI

# FIG._46B

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Wallstiy Targeted Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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AATT	AATCCCTCAG TTAGGGAGTC	CATTGTTCAT GTAACAAGTA	CGGTAGTTTT GCCATCAAAA	TCTTTTCATG AGAAAAGTAC	ATTTGTGACA TAAACACTGT	AATGCAGCCT TTACGTCGGA	CGTGCGGAGC GCACGCCTCG
TTT! AAA?	TTTTTGTAG AAAAAACATC	HindIII ~~~~~ GTAGAAGCTT CATCTTCGAA	ACCATGATCC TGGTACTAGG	ACACCAACCT TGTGGTTGGA	CAAAAAGAAG GTTTTTCTTC	TTCTCCCTCT AAGAGGGAGA	<b>TCATCCTCGT</b> <b>AGTAGGAGCA</b>
CTT	CTTCCTCCTC GAAGGAGGAG	<b>TTCGCCGTGA</b> <b>AAGCGGCACT</b>	TCTGCGTGTG AGACGCACAC	GAAGAAGGGC CTTCTTCCCG	TCCGACTACG AGGCTGATGC	AGGCCCTCAC TCCGGGAGTG	CCTCCAAGCC GGAGGTTCGG
AAG	AAGGAGTTCC TTCCTCAAGG	NotI AAATGGGGGC GGC TTTACGGCG GCG	CGCCTCCACG GCGGAGGTGC	CAGGGCATCT GTCCCGTAGA	CCGAAGACCT GGCTTCTGGA	CTACAGCCGT GATGTCGGCA	TTAGTCGAAA AATCAGCTTT
TGC	TGGCCACTAT	CTCCCAAGCT GAGGGTTCGA	GCCTACGCCG CGGATGCGGC	ACCTGTGCAA TGGACACGTT	Sali Acci CATTCCGTCG A	  ACTATTATCA TGATAATAGT	AGGGAGAGAA TCCCTCTCTT
AA1 TT7	AATTTACAAT TTAAATGTTA	TCTCAAACTG AGAGTTTGAC	ACATTAACGG TGTAATTGCC	BamHI ~~~~~~ ATGGATCCTC TACCTAGGAG	CGCGACGACA GCGCTGCTGT	GCAGCAAAGA CGTCGTTTCT	AATAATCACC TTATTAGTGG
E S	GTCTTCCGTG	GCACTGGTAG	TGATACGAAT ACTATGCTTA	CTACAACTCG GATGTTGAGC	ATACTAACTA TATGATTGAT	CACCCTCACG GTGGGAGTGC	CCTTTCGACA GGAAAGCTGT
ပ် ဗွ	CCCTACCACA	ATGCAACGGT TACGTTGCCA	TGTGAAGTAC ACACTTCATG	ACGGTGGATA TGCCACCTAT	TTATATTGGA AATATAACCT	TGGGTCTCCG ACCCAGAGGC	TCCAGGACCA AGGTCCTGGT

# F/G._46C

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls."

Expression of Genes Encoding Cell Wall...

SN# 09/991,209; Dunn-Coleman et al.

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1331	AGTCGAGTCG TCAGCTCAGC	CTTGTCAAAC GAACAGTTTG	AGCAGGTTAG TCGTCCAATC	CCAGTATCCG GGTCATAGGC	GACTACGCGC CTGATGCGCG	TGACCGTGAC ACTGGCACTG	CGGCCACKCC GCCGGTGMGG
1401	CTCGGCGCCT	CTCGGCGCCT CCCTGGCGGC GAGCCGCGGA GGGACCGCCG	ACTCACTGCC TGAGTGACGG	GCCCAGCTGT CGGGTCGACA	CTGCGACATA	CGACAACATC GCTGTTGTAG	CGCCTGTACA GCGGACATGT
1471	CCTTCGGCGA GGAAGCCGCT	CCTTCGGCGA ACCGCGCAGC GGAAGCCGCT TGGCGCGTCG	GGCAATCAGG CCGTTAGTCC	CCTTCGCGTC GGAAGCGCAG	GTACATGAAC CATGTACTTG	GATGCCTTCC CTACGGAAGG	Xhoi ~~~~~ AAGCCTCGAG TTCGGAGCTC
1541	CCCAGATACG GGGTCTATGC	ACGCAGTATT TGCGTCATAA	TCCGGGTCAC AGGCCCAGTG	TCATGCCAAC AGTACGGTTG	GACGGCATCC CTGCCGTAGG	CAAACCTGCC GTTTGGACGG	CCCGGTGGAG GGGCCACCTC
1611	CAGGGGTACG GTCCCCATGC	Ncol CCCATGGCGG GGGTACCGCC	TGTAGAGTAC ACATCTCATG	TGGAGCGTTG ACCTCGCAAC	ATCCTTACAG TAGGAATGTC	CGCCCAGAAC GCGGGTCTTG	ACATTTGTCT TGTAAACAGA
1681	GCACTGGGGA	TGAAGTGCAG ACTTCACGTC	TGCTGTGAGG ACGACACTCC	CCCAGGGCGG	ACAGGGTGTG TGTCCCACAC	AATAATGCGC TTATTACGCG	ACACGACTTA TGTGCTGAAT
		į	Sphi	NC	Noti		
1751	TTTTGGGATG AAAACCCTAC	ACGAGCGGCG TGCTCGCCGC	CATGCACCTG GTACGTGGAC	GCCGGTCGCG GCCGCGGAAA CGGCCAGCGC CGGCGCCTTT	GCCGCGGAAA	CCACTGAAGG GGTGACTTCC	atgagctgta tactcgacat
1821	AAGAAGCAGA TTCTTCGTCT	TCGTTCAAAC AGCAAGTTTG	ATTTGGCAAT TAAACCGTTA	AAAGTTTCTT TTTCAAAGAA	AAGATTGAAT TTCTAACTTA	CCTGTTGCCG	GTCTTGCGAT CAGAACGCTA
1891	GATTATCATA CTAATAGTAT	TAATTTCTGT ATTAAAGACA	TGAATTACGT ACTTAATGCA	TAAGCATGTA ATTCGTACAT	ATAATTAACA TATTAATTGT	TGTAATGCAT ACATTACGTA	GACGTTATTT CTGCAATAAA

# FIG._46D

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls of Expression of Genes Encoding Cell Wall. SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 128 of 154

TTTTGAACTA

CCCGAGGGAA ATCCCAAGGC TAAATCACGA AATGCCGTGG AGCTGGGGTT

GTTCACGTAG TGGGCCATCG CCCTGATAGA CGGTTTTTCG

TAGGGTGATG

2521

AGATTTAGCC

ATCCCACTAC CAAGTGCATC ACCCGGTAGC GGGACTATCT GCCAAAAAGC

TTGGAGTCCA AACCTCAGGT

CCCTTTGACG

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BSSHII

GCCACCTCGA GGTTAAGCGG GATATCACTC AGCATAATGC GCGCGAGTGA CCGGCAGCAA AATGTTGCAG CCGATCGCCC TTCCCAACAG TTGCGCAGCC TGAATGGCGA ATGGGACGCG TACCCTGCGC CTTGCCAGCG CTGGCGATGT GAACGGTCGC CCCGTCAAGC GGGCAGTTCG TAGGGTTCCG ATTTAGTGCT TTACGGCACC TCGACCCCAA AAAACTTGAT TTAATCGCCT TGCAGCACAT CCCCCTTTCG CCAGCTGGCG CAATGGGTTG AATTAGCGGA ACGTCGTGTA GGGGGAAAGC GGTCGACCGC ACAGTAGATA CAATGATCTA GCTATTCGAA GATCTCGCCG GGCCGTCGTT TTACAACGTC AAAAATACTA ATCTCAGGGC GTTAATATGT AAATTATGCG CTATCTTTTG TTTTATATCG CTAGAGCGGC TTTTTATGAT TAGAGTCCCG CAATTATACA TTTAATACGC GATAGAAAAC AAAATATAGC XbaI HindIII GTTACTAGAT CGATAAGCTT GGCTAGCGGG AAGGGTTGTC AACGCGTCGG ACTTACCGCT CGCGCAGCGT GACCGCTACA CGGCCGAAAG GCCGGCTTTC ClaI CTATAGTGAG TCGTATTACG CGCGCTCACT GCTTTCTTCC CTTCCTTTCT CGCCACGTTC GGGATCGCGG GCGAGGAAAG CGAAAGAAGG GAAGGAAAGA GCGGTGCAAG GCGCGTCGCA BSSHII GCGCCCCCA CACCACCAAT GTGGTGGTTA TGTCATCTAT CGCGGCGGGT GTTACCCAAC TCGCGCGCGG AGCGCGCGCC BSSHII CGCTCCTTTC GGGCTCCCTT CGCGTAATTC CGGTGGAGCT CCAATTCGCC GAGGCCCGCA GCGCATTAAG TTTGGGACCG CTCCGGGCGT GGATAAATTA CCTATTTAAT AAACCCTGGC TCTAAATCGG CCCTGTAGCG CCCTAGCGCC GTGACTGGGA TAATAGCGAA ATTATCGCTT GGGACATCGC PACTCTACCC CACTGACCCT ATGAGATGGG GCGCAAACTA CGCGTTTGAT BSSHII 2381 2451 2171 2241 2311 2101 1961 2031

# F/G._46E

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Target Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 129 of 154

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2591	CGTTCTTTAA GCAAGAAATT	TAGTGGACTC ATCACCTGAG	TTGTTCCAAA AACAAGGTTT	CTGGAACAAC	ACTCAACCCT TGAGTTGGGA	ATCTCGGTCT TAGAGCCAGA	ATTCTTTTGA TAAGAAACT
2661	TTTATAAGGG	ATTTTGCCGA	TTTCGGCCTA	TTGGTTAAAA	AATGAGCTGA	TTTAACAAAA	ATTTAACGCG
	AAATATTCCC	TAAAACGGCT	AAAGCCGGAT	AACCAATTTT	TTACTCGACT	AAATTGTTTT	TAAATTGCGC
2731	AATTTTAACA	AAATATTAAC	GCTTACAATT	TAGGTGGCAC	TTTTCGGGGA	AATGTGCGCG	GAACCCCTAT
	TTAAAATTGT	TTTATAATTG	CGAATGTTAA	ATCCACCGTG	AAAAGCCCCT	TTACACGCGC	CTTGGGGATA
2801	TTGTTTATTT	TTCTAAATAC	ATTCAAATAT	GTATCCGCTC	ATGAGACAAT	AACCCTGATA	AATGCTTCAA
	AACAAATAAA	AAGATTTATG	TAAGTTTATA	CATAGGCGAG	TACTCTGTTA	TTGGGACTAT	TTACGAAGTT
2871	TAATATTGAA ATTATAACTT	AAAGGAAGAG TTTCCTTCTC	TATGAGTATT ATACTCATAA	CAACATTTCC GTTGTAAAGG	GTGTCGCCCT	TATTCCCTTT ATAAGGGAAA	TTTGCGGCAT AAACGCCGTA
2941	TTTGCCTTCC	TGTTTTTGCT	CACCCAGAAA	CGCTGGTGAA	AGTAAAAGAT	GCTGAAGATC	AGTTGGGTGC
	AAACGGAAGG	ACAAAAACGA	GTGGGTCTTT	GCGACCACTT	TCATTTTCTA	CGACTTCTAG	TCAACCCACG
3011	ACGAGTGGGT	TACATCGAAC	TGGATCTCAA	CAGCGGTAAG	ATCCTTGAGA	GTTTTCGCCC	CGAAGAACGT
	TGCTCACCCA	ATGTAGCTTG	ACCTAGAGTT	GTCGCCATTC	TAGGAACTCT	CAAAAGCGGG	GCTTCTTGCA
3081	TTTCCAATGA	TGAGCACTTT	TAAAGTTCTG	CTATGTGGCG	CGGTATTATC	CCGTATTGAC	GCCGGGCAAG
	AAAGGTTACT	ACTCGTGAAA	ATTTCAAGAC	GATACACCGC	GCCATAATAG	GGCATAACTG	CGGCCCGTTC
3151	AGCAACTCGG	TCGCCGCATA	CACTATTCTC	AGAATGACTT	GGTTGAGTAC	TCACCAGTCA	CAGAAAAGCA
	TCGTTGAGCC	AGCGGCGTAT	GTGATAAGAG	TCTTACTGAA	CCAACTCATG	AGTGGTCAGT	GTCTTTTCGT
3221	TCTTACGGAT	GGCATGACAG	TAAGAGAATT	ATGCAGTGCT	GCCATAACCA	TGAGTGATAA	CACTGCGGCC
	AGAATGCCTA	CCGTACTGTC	ATTCTCTTAA	TACGTCACGA	CGGTATTGGT	ACTCACTATT	GTGACGCCGG
3291	AACTTACTTC TTGAATGAAG	TGACAACGAT ACTGTTGCTA	CGGAGGACCG GCCTCCTGGC	AAGGAGCTAA TTCCTCGATT	CCGCTTTTTT GGCGAAAAAA	GCACAACATG	GGGGATCATG CCCCTAGTAC
3361	TAACTCGCCT	TGATCGTTGG ACTAGCAACC	GAACCGGAGC	TGAATGAAGC ACTTACTTCG	CATACCAAAC GTATGGTTTG	GACGAGCGTG	ACACCACGAT TGTGGTGCTA

## FIG._46F

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targete Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 130 of 154

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3431	GCCTGTAGCA	ATGGCAACAA	CGTTGCGCAA	ACTATTAACT	GGCGAACTAC	TTACTCTAGC	TTCCCGGCAA
	CGGACATCGT	TACCGTTGTT	GCAACGCGTT	TGATAATTGA	CCGCTTGATG	AATGAGATCG	AAGGGCCGTT
3501	CAATTAATAG GTTAATTATC	ACTGGATGGA TGACCTACCT	GGCGGATAAA CCGCCTATTT	GTTGCAGGAC CAACGTCCTG	CACTTCTGCG GTGAAGACGC	CTCGGCCCTT	CCGGCTGGCT
3571	GGTTTATTGC	TGATAAATCT	GGAGCCGGTG	AGCGTGGGTC	TCGCGGTATC	ATTGCAGCAC	TGGGGCCAGA
	CCAAATAACG	ACTATTTAGA	CCTCGGCCAC	TCGCACCCAG	AGCGCCATAG	TAACGTCGTG	ACCCCGGTCT
3641	TGGTAAGCCC ACCATTCGGG	TCCCGTATCG AGGGCATAGC	TAGTTATCTA ATCAATAGAT	CACGACGGGG	AGTCAGGCAA TCAGTCCGTT	CTATGGATGA GATACCTACT	ACGAAATAGA TGCTTTATCT
3711	CAGATCGCTG	AGATAGGTGC	CTCACTGATT	AAGCATTGGT	AACTGTCAGA	CCAAGTTTAC	TCATATATAC
	GTCTAGCGAC	TCTATCCACG	GAGTGACTAA	TTCGTAACCA	TTGACAGTCT	GGTTCAAATG	AGTATATATG
3781	TTTAGATTGA	TTTAAAACTT	CATTTTTAAT	TTAAAAGGAT	CTAGGTGAAG	ATCCTTTTTG	ATAATCTCAT
	AAATCTAACT	AAATTTTGAA	GTAAAAATTA	AATTTTCCTA	GATCCACTTC	TAGGAAAAAC	TATTAGAGTA
3851	GACCAAAATC	CCTTAACGTG	AGTTTTCGTT	CCACTGAGCG	TCAGACCCCG	TAGAAAAGAT	CAAAGGATCT
	CTGGTTTTAG	GGAATTGCAC	TCAAAAGCAA	GGTGACTCGC	AGTCTGGGGC	ATCTTTTCTA	GTTTCCTAGA
3921	TCTTGAGATC AGAACTCTAG	CTTTTTTCT GAAAAAAAA	GCGCGTAATC CGCGCATTAG	TGCTGCTTGC ACGACGAACG	AAACAAAAAA TTTGTTTTTT	ACCACCGCTA TGGTGGCGAT	CCAGCGGTGG
3991	TTTGTTTGCC	GGATCAAGAG	CTACCAACTC	TTTTTCCGAA	GGTAACTGGC	TTCAGCAGAG	CGCAGATACC
	AAACAAACGG	CCTAGTTCTC	GATGGTTGAG	AAAAAGGCTT	CCATTGACCG	AAGTCGTCTC	GCGTCTATGG
4061	AAATACTGTC TTTATGACAG	CTTCTAGTGT GAAGATCACA	AGCCGTAGTT TCGGCATCAA	AGGCCACCAC TCCGGTGGTG	TTCAAGAACT AAGTTCTTGA	CTGTAGCACC	GCCTACATAC CGGATGTATG
4131	CTCGCTCTGC	TAATCCTGTT	ACCAGTGGCT TGGTCACCGA	GCTGCCAGTG CGACGGTCAC	GCGATAAGTC CGCTATTCAG	GTGTCTTACC CACAGAATGG	GGGTTGGACT CCCAACCTGA
4201	CAAGACGATA GTTCTGCTAT	GTTACCGGAT	AAGGCGCAGC TTCCGCGTCG	GGTCGGGCTG CCAGCCCGAC	AACGGGGGGT TTGCCCCCCA	TCGTGCACAC AGCACGTGTG	AGCCCAGCTT TCGGGTCGAA

# FIG._46G

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls of Targets Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 131 of 154

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4271	GGAGCGAACG	ACCTACACCG TGGATGTGGC	AACTGAGATA TTGACTCTAT	CCTACAGCGT GGATGTCGCA	GAGCTATGAG CTCGATACTC	AAAGCGCCAC TTTCGCGGTG	GCTTCCCGAA CGAAGGGCTT	
4341	GGGAGAAAGG CCCTCTTTCC	GGGAGAAAGG CGGACAGGTA CCCTCTTTCC GCCTGTCCAT	TCCGGTAAGC AGGCCATTCG	GGCAGGGTCG CCGTCCCAGC	GAACAGGAGA CTTGTCCTCT	GCGCACGAGG CGCGTGCTCC	GAGCTTCCAG CTCGAAGGTC	
4411	GGGGAAACGC CCCCTTTGCG	CTGGTATCTT GACCATAGAA	TATAGTCCTG ATATCAGGAC	TCGGGTTTCG AGCCCAAAGC	CCACCTCTGA GGTGGAGACT	CTTGAGCGTC GAACTCGCAG	gatttttgtg Ctaaaaacac	
4481	ATGCTCGTCA GGG TACGAGCAGT CCC	GGGGGGCGGA	GCCTATGGAA CGGATACCTT	AAACGCCAGC TTTGCGGTCG	AACGCGGCCT TTGCGCCGGA	TTTTACGGTT AAAATGCCAA	CCTGGCCTTT GGACCGGAAA	
4551	TGCTGGCCTT TTG ACGACCGGAA AAC	TTGCTCACAT AACGAGTGTA	GTTCTTTCCT CAAGAAAGGA	GCGTTATCCC CGCAATAGGG	CTGATTCTGT GACTAAGACA	GGATAACCGT CCTATTGGCA	ATTACCGCCT TAATGGCGGA	
4621	TTGAGTGAGC AACTCACTCG	TGATACCGCT ACTATGGCGA	CGCCGCAGCC	GAACGACCGA CTTGCTGGCT	GCGCAGCGAG	TCAGTGAGCG AGTCACTCGC	<b>AGGAAGCGGA</b> TCCTTCGCCT	
4691	AGAGCGCCCA TCTCGCGGGT	ATACGCAAAC TATGCGTTTG	CGCCTCTCCC GCGGAGAGGG	CGCGCGTTGG	CCGATTCATT GGCTAAGTAA	AATGCAGCTG TTACGTCGAC	GCACGACAGG CGTGCTGTCC	
4761	TTTCCCGACT AAAGGGCTGA	GGAAAGCGGG CCTTTCGCCC	CAGTGAGCGC GTCACTCGCG	AACGCAATTA TTGCGTTAAT	ATGTGAGTTA TACACTCAAT	GCTCACTCAT	TAGGCACCCC ATCCGTGGGG	
4831	AGGCTTTACA TCCGAAATGT	AGGCTTTACA CTTTATGCTT TCCGAAATGT GAAATACGAA	CCGGCTCGTA GGCCGAGCAT	TGTTGTGTGG ACAACACACC	AATTGTGAGC TTAACACTCG	GGATAACAAT CCTATTGTTA	TTCACACAGG AAGTGTGTCC	
			BSSHII	111			EcoRI	
4901	AAACAGCTAT TTTGTCGATA	AAACAGCTAT GACCATGATT TTTGTCGATA CTGGTACTAA	ACGCCAAGCG	ACGCCAAGCG CGCAATTAAC TGCGGTTCGC GCGTTAATTG	CCTCACTAAA GGAGTGATTT	GGGAACAAAA CCCTTGTTTT	GCTGG CGACC	

# FIG._46H

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Flangeted Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

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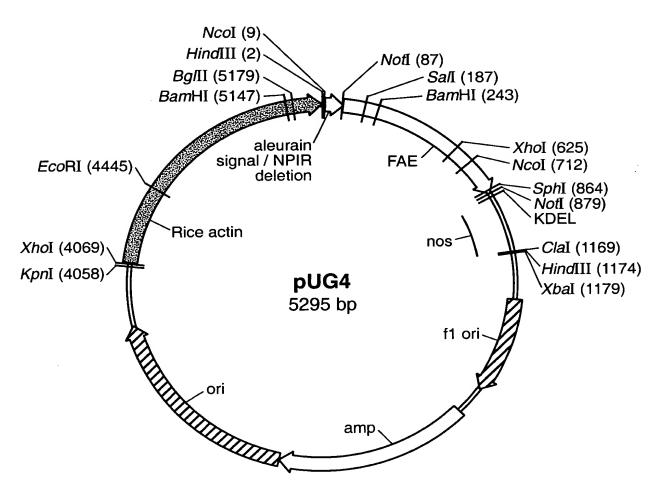


FIG._47A

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L V E M TAGTCGAAAT SCCGTCGCCG Н GGCCACGGCC TACAGCCGTT ĸ H ß × CICCIGGCGC ICGCCGIGCI CGAAGACCTC > Α 闰 AGGGCATCTC Н Ö Q AAGCTTACCA TGGCCCACGC CCGCGTCCTC GCCTCCACGC H > Ŋ 吆 ~~~~~~~~ Noti ວລອອລອລອລລ ĸ Ŋ ß

71

NCOI

HindIII

Н

GGGAGAGAAA 闰 Ü CTATTATCAA TCCCAAGCTG CCTACGCCGA CCTGTGCAAC ATTCCGTCGA Ø Z U д А 4 Ot ß GGCCACTATC 141

~~~~~~

SalI

BamHI

TGGATCCTCC GCGACGACAG CAGCAAGAA ATAATCACC × ល ß А ĸ \*\*\*\*\*\*\* ATTTACAATT CTCAAACTGA CATTAACGGA O Z A H O Z 211

TCTTCCGTGG CACTGGTAGT GATACGAATC TACAACTCGA TACTAACTAC ACCCTCACGC CTTTCGACAC CCTACCACAA TGCAACGGTT GTGAAGTACA CGGTGGATAT TATATTGGAT GGGTCTCCGT CCAGGACCAA × A ט Ç O ບ U 351 281

TCGCCCCTC CCTGCCGCA CTCACTGCCG CCCAGCTGTC TGCGACATAC GACAACATCC GCCTGTACAC Xhoi ĸ 4 491

GICGAGICGC IIGICAAACA GCAGGITAGC CAGIAICCGG ACIACGCGCI GACCGIGACC GGCCACKCC

421

CTTCGCGTCG TACATGAACG ATGCCTTCCA AGCCTCGAGC ß ഥ A Z Σ ט А 耳 CCGCGCAGCG GCAATCAGGC ⋖ O Z æ G ß 吆 Д CTTCGGCGAA 闰 Ö А 561

CCGGTGGAGC CATGCCAACG ACGCCATCCC AAACCTGCCC CCAGATACGA CGCAGTATTT CCGGGTCACT 631

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GCCCAGAACA CATTTGTCTG CTTGCGATGA CGTTATTAT CACTGGGGAT GAAGTGCAGT GCTGTGAGGC CCAGGGCGGA CAGGGTGTGA ATAATGCGCA CACGACTTAT GAGCTGTAAA AATATAGCGC 闰 ACTGAAGGAT TAGAAAACAA TGTTGCCGGT TAATGCATGA HindIII × Н CCGGTCGCGG CCGCGGAACC AGGGGTACGC CCATGGCGGT GTAGAGTACT GGAGCGTTGA TCCTTACAGC GAGTCCCGCA ATTATACATT TAATACGCGA Д GATTGAATCC AATTAACATG Þ 떰 22222222 Noti 4 AGCATGTAAT AGTTTCTTAA Ö ď U Д TTTGGGATGA CGAGCGCCC ATGCACCTGG TTGGCAATAA TTATCATATA ATTTCTGTTG AATTACGTTA 3 闰 H U ບ ບ GAAGCAGATC GTTCAAACAT GAGATGGGTT TTTATGATTA 4 O ß 闰 H D G Σ O H 701 771 911 981 1051

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GGGACGCGCC GGAGTCCACG TTAACGCGAA CGGGCAAGAG CTGCGGCCAA ACCACGATGC TACTAGATCG ATAAGCTTCT AGAGCGGCCG CCGTCGTTTT ACAACGTCGT AGCTGGCGTA TGCCAGCGCC CGTCAAGCTC AACTTGATTA ACCCCTATT TGCTTCAATA TTGGGTGCAC GGATCATGTA CCCGGCAACA TCTTTTGALT TGCGGCATTT AAGAACGTTT GAAAAGCATC CCCTTTCGCC AATGGCGAAT CCGCTACACT CGGCTTTCCC GACCCCAAAA TAACAAAAT TGTGCGCGGA CCCTGATAAA TTCCCTTTTT TGAAGATCAG TTTCGCCCCG GTATTGACGC ACCAGTCACA AGTGATAACA ACAACATGGG CGAGCGTGAC ACTCTAGCTT CTTTGACGTT CTCGGTCTAT GCGCAGCCTG CGCTCACTGG CAGCACATCC CGCAGCGTGA CCACGTTCGC GTTTTTCGCC TCAACCCTAT TGAGCTGATT GAGACAATAA GTCGCCCTTA TTGAGTACTC CATAACCATG GCTTTTTGC TACCAAACGA TTGCGCAAAC TATTAACTGG CGAACTACTT ACGGCACCTC TTCGGGGAAA TAAAAGATGC CCTTGAGAGT GTATTATCCC TCATCTATGT CTATTCTCAG AATGACTTGG GCAGTGCTGC AATGAAGCCA GTATTACGCG AATCGCCTTG CCCAACAGTT GGTGGTTACG TCCTTTCTCG TTAGTGCTTT CTGATAGACG GGAACAACAC GGTTAAAAA GGTGGCACTT ATCCGCTCAT ACATTTCCGT CTGGTGAAAG GCGGTAAGAT ATGTGGCGCG GGAGCTAACC ACCGGAGCTG AAGTTCTGCT GAGGACCGAA GCGCGCGGTG TCAAATATGT TGAGTATTCA GATCTCAACA AGAGAATTAT ATAGTGAGTC TACCCAACTT GATCGCCCTT CGGCGGGTGT **PTTCTTCCCT** GGGTTCCGAT GGCCATCGCC GTTCCAAACT TCGGCCTATT TTACAATTTA CCCAGAAACG CATGACAGTA ATCGTTGGGA AGCACTTTTA GCCGCATACA GGCAACAACG ATAATTATC AATTCGCCCT TCACGTAGTG TTTGCCGATT CTAAATACAT AGGAAGAGTA TTTTTGCTCA CATCGAACTG ACAACGATCG ACCCTGGCGT GCATTAAGCG CTCCTTTCGC GCTCCCTTTA GTGGACTCTT ATATTAACGC GGCCGCCACC GCAAACTAGG ACTCGCCTTG GGGTGATGGT PGCCTTCCTG CCAATGATG TTACTTCTG CTGTAGCAAT GTGGAGCTCC SACTGGGAAA ATAGCGAAGA CTGTAGCGGC CTAGCGCCCG TAAATCGGGG **LTCTTTAATA** TATAAGGGAT TTTAACAAA GTTTATTTT ATATTGAAAA GAGTGGGTTA CAACTCGGTC TTACGGATGG 1611 1891 1191 1261 1331 401 1471 541 681 2031 2171 2241 2381 1751 821 1961 2101 2311 2451

FIG.\_47C

"Manipulation of the Phenolic Acid Conte Digestibility of Plant Cell Walls by Target Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 135 of 154

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| g | ATTA ATTACA | ひじゃ ひひむ へひひむ | 中で 女 女 女 女 女 なびじい | をして をして をして 田 | 出っていている。 | | ではついて |
|------|---|--------------|----------------------------|---|------------|------------|---|
| | TTTATTGCTG | AT | AGCCGGTGAG | CGTGGGTCTC | GCGGTATCAT | TGCAGCACTG | GGGCCAGATG |
| 73 | GTAAGCCCTC | CCGTATCGTA | GTTATCTACA | CGACGGGGAG | TCAGGCAACT | ATGGATGAAC | GAAATAGACA |
| 80 | GATCGCTGAG | ATAGGTGCCT | CACTGATTAA | GCATTGGTAA | CTGTCAGACC | AAGTTTACTC | ATATATACTT |
| 87 | TAGATTGATT | TAAAACTTCA | TTTTAATTT | AAAAGGATCT | AGGTGAAGAT | CCTTTTTGAT | AATCTCATGA |
| 94 | CCAAAATCCC | TTAACGTGAG | TTTTCGTTCC | ACTGAGCGTC | AGACCCCGTA | GAAAAGATCA | AAGGATCTTC |
| 01 | TTGAGATCCT | | GCGTAATCTG | CTGCTTGCAA | ACAAAAAAC | CACCGCTACC | AGCGGTGGTT |
| 08 | TGTTTGCCGG | | ACCAACTCTT | TTTCCGAAGG | TAACTGGCTT | CAGCAGAGCG | CAGATACCAA |
| 15 | ATACTGTCCT | TCTAGTGTAG | CCGTAGTTAG | GCCACCACTT | CAAGAACTCT | GTAGCACCGC | CTACATACCT |
| 22 | CGCTCTGCTA | ATCCTGTTAC | CAGTGGCTGC | TGCCAGTGGC | GATAAGTCGT | GTCTTACCGG | GTTGGACTCA |
| 29 | AGACGATAGT | TACCGGATAA | GGCGCAGCGG | TCGGGCTGAA | CGGGGGGTTC | GTGCACACAG | CCCAGCTTGG |
| 36 | AGCGAACGAC | CTACACCGAA | CTGAGATACC | TACAGCGTGA | GCTATGAGAA | AGCGCCACGC | TTCCCGAAGG |
| 43 | GAGAAAGGCG | GACAGGTATC | CGGTAAGCGG | CAGGGTCGGA | ACAGGAGAGC | GCACGAGGGA | GCTTCCAGGG |
| | GGAAACGCCT | GGTATCTTTA | TAGTCCTGTC | GGGTTTCGCC | ACCTCTGACT | TGAGCGTCGA | TTTTTGTGAT |
| 57 | GCTCGTCAGG | GGGCGGAGC | CTATGGAAAA | ACGCCAGCAA | CGCGGCCTTT | TTACGGTTCC | TGGCCTTTTG |
| 64 | CTGGCCTTTT | GCTCACATGT | TCTTTCCTGC | GTTATCCCCT | GATTCTGTGG | ATAACCGTAT | TACCGCCTTT |
| 71 | GAGTGAGCTG | ATACCGCTCG | CCGCAGCCGA | ACGACCGAGC | GCAGCGAGTC | AGTGAGCGAG | GAAGCGGAAG |
| 78 | AGCGCCCAAT | ACGCAAACCG | CCICICCCCG | CGCGTTGGCC | GATTCATTAA | TGCAGCTGGC | ACGACAGGTT |
| 3851 | TCCCGACTGG | AAAGCGGGCA | GTGAGCGCAA | CGCAATTAAT | GTGAGTTAGC | TCACTCATTA | GGCACCCCAG |
| 92 | GCTTTACACT | TTATGCTTCC | GGCTCGTATG | TTGTGTGGAA | TTGTGAGCGG | ATAACAATTT | CACACAGGAA |
| | | | | | | | KpnI |
| | | | | | | | 5 |
| 3991 | ACAGCTATGA CO | CCATGATTAC | GCCAAGCGCG | CAATTAACCC | TCACTAAAGG | GAACAAAAGC | TGGGTACCGG |
| | 2 | 1 2 2 | | | | | |
| 4061 | しようじじじじじじ | GAGGTCATTC | ターマーシーターターターターターターターターターター | ン上さなけなけるなると | うしまじなよるじじじ | SASABARAS | ないな なかりじな なな |
| 13 | TTACCTGGTC | AAAGTGAAA | ACATCAGTTA | AAAGGTGGTA | TAAGTAAAT | ATCGGTAATA | A A A G T T T T T T T T T T T T T T T T |
| 4201 | CAAAGTGAAA | TTTACTCTTT | TCTACTATTA | TAAAAATTGA | GGATGTTTTG | TCGGTACTTT | GATACGTCAT |
| _ | TTTTGTATGA | ATTGGTTTTT | AAGTTTATTC | GCGATTTGGA | AATGCATATC | TGTATTTGAG | TCGGTTTTTA |
| 34 | AGTTCGTTGC | TTTTGTAAAT | ACAGAGGGAT | TTGTATAGA | AATATCTTTA | AAAAACCCAT | ATGCTAATTT |
| | | | | ECORI | | | |
| | | | | 1 | | | |
| 4411 | GACATAATTT | TTGAGAAAAA | TATATATTCA | GGCGAATTCC | ACAATGAACA | ATAATAAGAT | TAAAATAGCT |
| 4481 | | GCAGCGATGG | GTATTTTTC | TAGTAAAATA | AAAGATAAAC | TTAGACTCAA | AACATTTACA |
| 4551 | AAAACAACCC | CTAAAGTCCT | AAAGCCCAAA | GTGCTATGCA | CGATCCATAG | CAAGCCCAGC | CCAACCCAAC |
| 4621 | CCAACCCAAC | CCACCCCAGT | GCAGCCAACT | GGCAAATAGT | CTCCACCCC | GGCACTATCA | CCGTGAGTTG |

-1G.\_47D

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted Expression of Genes Encoding Cell Wall..."

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| | | | GTAGC | GAGCTTTTTT | CATGATTTGT GACAAATGCA GCCTCGTGCG GAGCTTTTTT GTAGC | GACAAATGCA | CATGATTTGT | 5251 |
|------------|------------------|------------|------------|--|--|------------|------------|------|
| E | TTTTTT | TCATCGGTAG | TCAGCATTGT | TTTGAATCCC | TCTTCTTTCT TTCTTTTT TGTGGTAGAA TTTGAATCCC TCAGCATTGT TCATCGGTAG TTTTTCTTTT | TTCTTCTTT | TCTTCTTTCT | 5181 |
| | | | | | | | Bglii | |
| ď | CGGATGTAG | ATGGGGCTCT | CTCGCGGGA | GGCCCGGATC | TCTCGCGGCT GGCGTCTCCG GGCGTGAGTC GGCCCGGATC CTCGCGGGGA ATGGGGCTCT CGGATGTAGA | GGCGTCTCCG | TCTCGCGGCT | 5111 |
| Bglii | Bg | | | BarnHI | | | | |
| ₫. | AGGGGCGGG | GGTGCGCGGG | CGCCCAGATC | GCGGCTTCGT | GGTAGTTTGG GTGGGCGAGA GCGGCTTCGT CGCCCAGATC GGTGCGCGGG AGGGGCGGGA | GGTAGTTTGG | CTTTGGCCTT | 5041 |
| - | CGGTCTCGA | TTTTTCGTCT | CTCCGTTTTT | CTCTTTCTTT | GTAACCACCC CGCCCTCTC CTCTTTCTTT CTCCGTTTTT TTTTTCGTCT CGGTCTCGAT | GTAACCACCC | ອວວອວວອວວອ | 4971 |
| E) | CICCCCTC | CTCCTCCCC | GGACGACGAG | CCTCGCTGCC | TACCACCACC ACCACCACCA CCTCCTCCC CCTCGCTGCC GGACGACGAG CTCCTCCCCC CTCCCCCTCC | ACCACCACCA | TACCACCACC | 4901 |
| (3 | CCCCCAACC | TCCTCCCATC | CCCCCCCTC | TATATACATA | CGCTTCCAAA GAAACGCCCC CCATCGCCAC TATATACATA CCCCCCCTC TCCTCCCATC CCCCCAACCC | GAAACGCCCC | CGCTTCCAAA | 4831 |
| 5 3 | GCCCTCCCT | ACGAGGCCCG | GCGAGCAGCG | GAGGAGGATC | GTCGTGGGGG CCGGAAAAGC GAGGAGGATC GCGAGCAGCG ACGAGGCCCG GCCCTCCCTC | GTCGTGGGGG | GTGGGTCCGG | 4761 |
| ריז | AAAACAGCA | AAGAAAAGA | AAAGAAAAA | TCCGCACCAC CGCACGTCTC GCAGCCAAAA AAAAAAAA AAAAAAAA AAGAAAAAA AAAAAAA | GCAGCCAAAA | CGCACGTCTC | TCCGCACCAC | 469I |

FIG.\_47E

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Fargeted Expression of Genes Encoding Cell Wall..."

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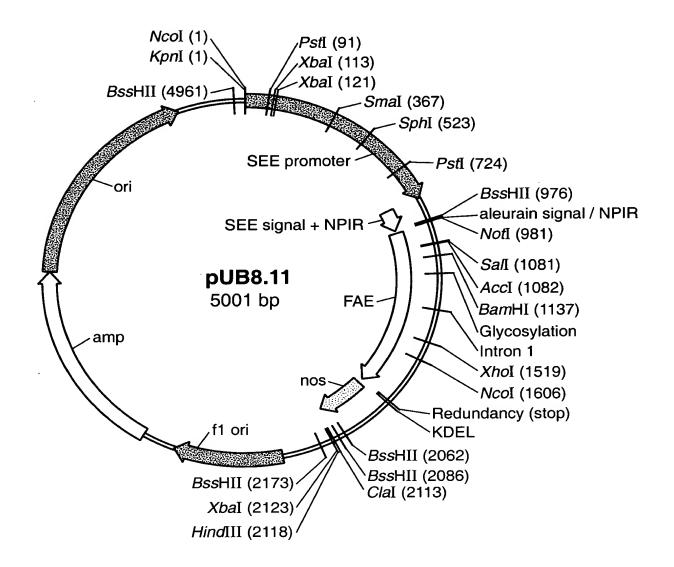


FIG.\_48A

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KpnI

"Manipulation of the Phenolic Acid Content
Digestibility of Plant Cell Wallsby Targete
Expression of Genes Encoding Cell Wall...
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| 631 | CTAATTAATT
GATTAATTAA | TATAGCAAGA
ATATCGTTCT | TTCTGTAGTG
AAGACATCAC | CACATCGCAA
GTGTAGCGTT | ATATCTTTCT (
TATAGAAAGA (| GGGCATTACA (CCCGTAATGT (| GCTGGAGGCT
CGACCTCCGA |
|------|----------------------------------|--------------------------|--------------------------|--|--|--|--------------------------|
| | | ν2 τ
Ο τ | Pst I | | | | |
| 701 | TCATCAGCCT
AGTAGTCGGA | GAAACACTCT | GCAGAGCCTG | AAGCAAGTGG
TTCGTTCACC | TGAAGCGTGG
ACTTCGCACC | CGATGAGATG
GCTACTCTAC | GGTATAAAAC
CCATATTTTG |
| 771 | CCCCGGCACC | GGGACGCGAG
CCCTGCGCTC | CTCCCGCCTA | CCAGTACCAT
GGTCATGGTA | CTCGCCTCGC | TCCCCCTGCC | GGACGACCCA
CCTGCTGGGT |
| 841 | GTAAAATACT
CATTTTATGA | GTTGCCCACT | CGCCGGCGAG | ATGGCCCACG
TACCGGGTGC | GCCGCATCCT | CTTCTTGGCG CTCGCCGTCT
GAAGAACCGC GAGCGGCAGA | CTCGCCGTCT
GAGCGGCAGA |
| | | | | | | | BSSHII ~~~~~ NotI |
| 911 | TGGCCACCGC
ACCGGTGGCG | CGCGGTGGCC | GCCGCATCNT
CGGCGTAGNA | TGGCGGACTC
ACCGCCTGAG | CAACCCGATC
GTTGGGCTAG | CGGCCCGTCA | eccasecece
socosecece |
| 981 | NotI
GGCCGCCTCC
CCGGCGGAGG | ACGCAGGGCA
TGCGTCCCGT | | TCTCCGAAGA CCTCTACAGC
AGAGGCTTCT GGAGATGTCG | CGTTTAGTCG
GCAAATCAGC | AAATGGCCAC
TTTACCGGTG | TATCTCCCAA
ATAGAGGGTT |
| | | | ì | Sall | | | |
| 1051 | GCTGCCTACG
CGACGGATGC | CCGACCTGTG
GGCTGGACAC | CAACATTCC | | TCAAGGGAGA GAAAATTTAC
AGTTCCCTCT CTTTTAAATG | GAAAATTTAC
CTTTTAAATG | AATTCTCAAA
TTAAGAGTTT |

FIG.\_48C

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Wall Target Expression of Genes Encoding Cell Wall...

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| 1121 | CTGACATTAA
GACTGTAATT | CGGATGGATC | CTCCGCGACG
GAGGCGCTGC | ACAGCAGCAA
TGTCGTCGTT | AGAAATAATC
TCTTTATTAG | ACCGTCTTCC
TGGCAGAAGG | GTGGCACTGG
CACCGTGACC |
|------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------------------|--------------------------------|--|
| 1191 | TAGTGATACG
ATCACTATGC | AATCTACAAC
TTAGATGTTG | TCGATACTAA
AGCTATGATT | CTACACCCTC
GATGTGGGAG | ACGCCTTTCG
TGCGGAAAGC | ACACCCTACC
TGTGGGATGG | ACAATGCAAC
TGTTACGTTG |
| 1261 | GGTTGTGAAG
CCAACACTTC | TACACGGTGG
ATGTGCCACC | ATATTATATT
TATAATATAA | GGATGGGTCT
CCTACCCAGA | CCGTCCAGGA | CCAAGTCGAG
GGTTCAGCTC | TCGCTTGTCA
AGCGAACAGT |
| 1331 | AACAGCAGGT
TTGTCGTCCA | TAGCCAGTAT
ATCGGTCATA | CCGGACTACG
GGCCTGATGC | CGCTGACCGT
GCGACTGGCA | GACCGGCCAC
CTGGCCGGTG | KCCCTCGGCG | CCTCCCTGGC
GGAGGGACCG |
| 1401 | GGCACTCACT
CCGTGAGTGA | GCCGCCCAGC | TGTCTGCGAC
ACAGACGCTG | ATACGACAAC
TATGCTGTTG | ATCCGCCTGT
TAGGCGGACA | ACACCTTCGG
TGTGGAAGCC | CGAACCGCGC |
| 1471 | AGCGGCAATC
TCGCCGTTAG | AGGCCTTCGC
TCCGGAAGCG | GTCGTACATG
CAGCATGTAC | AACGATGCCT
TTGCTACGGA | XhoI
TCCAAGCCTC G
AGGTTCGGAG C | or
Gagcccagat
Ctcgggtcta | ACGACGCAGT
TGCTGCGTCA |
| 1541 | ATTTCCGGGT
TAAAGGCCCA | CACTCATGCC
GTGAGTACGG | AACGACGGCA
TTGCTGCCGT | TCCCAAACCT
AGGGTTTGGA | GCCCCGGTG | GAGCAGGGGT
CTCGTCCCCA | NCOI
~~~~~~
ACGCCCATGG
TGCGGGTACC |
| 1611 | CGGTGTAGAG
GCCACATCTC | TACTGGAGCG
ATGACCTCGC | TTGATCCTTA
AACTAGGAAT | CAGCGCCCAG
GTCGCGGGTC | AACACATTTG
TTGTGTAAAC | TCTGCACTGG
AGACGTGACC | GGATGAAGTG
CCTACTTCAC |
| 1681 | CAGTGCTGTG | AGGCCCAGGG
TCCGGGTCCC | CGGACAGGGT
GCCTGTCCCA | GTGAATAATG
CACTTATTAC | CGCACACGAC
GCGTGTGCTG | TTATTTTGGG
AATAAAACCC | ATGACGAGCG
TACTGCTCGC |
| 1751 | GAGCCTGTAC
CTCGGACATG | ATGGTGATCA
TACCACTAGT | GTCATTTCAG
CAGTAAAGTC | CCTCCCGAG | TGTACCAGGA
ACATGGTCCT | AAGATGGATG
TTCTACCTAC | TCCTGGAGAG
AGGACCTCTC |

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FIG.\_48D

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| | | | | | | | | • |
|--------------------------|--------------------------|--------------------------|---|---|-----------------------------------|--------------------------|--------------------------|--------------------------|
| ATAAAGTTTC
TATTTCAAAG | GTTAAGCATG
CAATTCGTAC | CGCAATTATA
GCGTTAATAT | GGTGTCATCT
CCACAGTAGA | AGTCGTATTA
TCAGCATAAT | ACTTAATCGC
TGAATTAGCG | CCTTCCCAAC
GGAAGGGTTG | GTGTGGTGGT
CACACCACCA | CCCTTCCTTT
GGGAAGGAAA |
| ACATTTGGCA
TGTAAACCGT | GTTGAATTAC
CAACTTAATG | ATTAGAGTCC
TAATCTCAGG | BSSHII
~~~~~
TATCGCGCGC
ATAGCGCGCG | CCCTATAGTG | GCGTTACCCA | CACCGATCGC
GTGGCTAGCG | AGCGCGGCGG
TCGCGCCGCC | TCGCTTTCTT
AGCGAAAGAA |
| GATCGTTCAA
CTAGCAAGTT | TATAATTTCT
ATATTAAAGA | GGTTTTTATG
CCAAAAATAC | TAGGATAAAT
ATCCTATTTA | CTCCAATTCG
GAGGTTAAGC | GAAAACCCTG
CTTTTGGGAC | AAGAGGCCCG
TTCTCCGGGC | CGGCGCATTA | CCCGCTCCTT |
| TAAAGAAGCA
ATTTCTTCGT | ATGATTATCA
TACTAATAGT | TTATGAGATG
AATACTCTAC | Bsshii
~~~~~
GCGCGCAAAC
CGCGCGTTTG | GCCGGTGGAG
CGGCCACCTC | TCGTGACTGG
AGCACTGACC | CGTAATAGCG
GCATTATCGC | CGCCCTGTAG
GCGGGACATC | CGCCCTAGCG |
| GGATGAGCTG
CCTACTCGAC | CGGTCTTGCG
GCCAGAACGC | ATGACGTTAT
TACTGCAATA | АСААААТАТА
ТGTTTTATAT | XbaI
~~~~~~
III
TTCTAGAGCG
AAGATCTCGC | TTTTACAACG
AAAATGTTGC | CGCCAGCTGG
GCGGTCGACC | GAATGGGACG
CTTACCCTGC | CACTTGCCAG
GTGAACGGTC |
| AACCACTGAA
TTGGTGACTT | ATCCTGTTGC
TAGGACAACG | CATGTAATGC
GTACATTACG | GCGATAGAAA
CGCTATCTTT | Clal Hindili
ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ | CTGGCCGTCG | ATCCCCCTTT
TAGGGGGAAA | CCTGAATGGC
GGACTTACCG | GTGACCGCTA
CACTGGCGAT |
| GGGCCGCGT | TTAAGATTGA
AATTCTAACT | TAATAATTAA
ATTATTAATT | CATTTAATAC
GTAAATTATG | ATGTTACTAG
TACAATGATC | Bashii
ccccccaca
GCGCGCCAGT | CTTGCAGCAC
GAACGTCGTG | AGTTGCGCAG
TCAACGCGTC | TACGCGCAGC
ATGCGCGTCG |
| 1821 | 1891 | 1961 | 2031 | 2101 | 2171 | 2241 | 2311 | 2381 |

FIG.\_48E

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeton Cell Walls by Targeton Cell Walls."

Expression of Genes Encoding Cell Wall...

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| 2451 | CTCGCCACGT
GAGCGGTGCA | TCGCCGGCTT
AGCGGCCGAA | TCCCCGTCAA
AGGGGCAGTT | GCTCTAAATC
CGAGATTTAG | GGGGCTCCC | TTTAGGGTTC
AAATCCCAAG | CGATTTAGTG
GCTAAATCAC |
|------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------------------|--------------------------|
| 2521 | CTTTACGGCA | CCTCGACCCC | AAAAAACTTG | ATTAGGGTGA | TGGTTCACGT | AGTGGGCCAT | CGCCCTGATA |
| | GAAATGCCGT | GGAGCTGGGG | TTTTTTGAAC | TAATCCCACT | ACCAAGTGCA | TCACCCGGTA | GCGGGACTAT |
| 2591 | GACGGTTTTT
CTGCCAAAAA | CGCCCTTTGA
GCGGGAAACT | CGTTGGAGTC
GCAACCTCAG | CACGTTCTTT
GTGCAAGAAA | AATAGTGGAC
TTATCACCTG | TCTTGTTCCA AGAACAAGGT | AACTGGAACA
TTGACCTTGT |
| 2661 | ACACTCAACC | CTATCTCGGT | CTATTCTTTT | GATTTATAAG | GGATTTTGCC | GATTTCGGCC | TATTGGTTAA |
| | TGTGAGTTGG | GATAGAGCCA | GATAAGAAAA | CTAAATATTC | CCTAAAACGG | CTAAAGCCGG | ATAACCAATT |
| 2731 | AAAATGAGCT | GATTTAACAA | AAATTTAACG | CGAATTTTAA | CAAAATATTA | ACGCTTACAA | TTTAGGTGGC |
| | TTTTACTCGA | CTAAATTGTT | TTTAAATTGC | GCTTAAAATT | GTTTTATAAT | TGCGAATGTT | AAATCCACCG |
| 2801 | ACTTTTCGGG
TGAAAAGCCC | GAAATGTGCG
CTTTACACGC | CGGAACCCCT | ATTTGTTTAT
TAAACAAATA | TTTTCTAAAT
AAAAGATTTA | ACATTCAAAT
TGTAAGTTTA | ATGTATCCGC
TACATAGGCG |
| 2871 | TCATGAGACA | ATAACCCTGA | TAAATGCTTC | AATAATATTG | AAAAAGGAAG | AGTATGAGTA | TTCAACATTT |
| | AGTACTCTGT | TATTGGGACT | ATTTACGAAG | TTATTAAC | TTTTTCCTTC | TCATACTCAT | AAGTTGTAAA |
| 2941 | CCGTGTCGCC | CTTATTCCCT
GAATAAGGGA | TTTTTGCGGC
AAAAACGCCG | ATTTTGCCTT
TAAAACGGAA | CCTGTTTTTG
GGACAAAAAC | CTCACCCAGA | AACGCTGGTG
TTGCGACCAC |
| 3011 | AAAGTAAAAG
TTTCATTTTC | ATGCTGAAGA
TACGACTTCT | TCAGTTGGGT
AGTCAACCCA | GCACGAGTGG | GTTACATCGA | ACTGGATCTC
TGACCTAGAG | AACAGCGGTA
TTGTCGCCAT |
| 3081 | AGATCCTTGA | GAGTTTTCGC | CCCGAAGAAC | GTTTTCCAAT | GATGAGCACT | TTTAAAGTTC | TGCTATGTGG |
| | TCTAGGAACT | CTCAAAAGCG | GGGCTTCTTG | CAAAAGGTTA | CTACTCGTGA | AAATTTCAAG | ACGATACACC |
| 3151 | CGCGGTATTA
GCGCCATAAT | TCCCGTATTG
AGGCCATAAC | ACGCCGGGCA | AGAGCAACTC
TCTCGTTGAG | GGTCGCCGCA | TACACTATTC
ATGTGATAAG | TCAGAATGAC
AGTCTTACTG |
| 3221 | TTGGTTGAGT | ACTCACCAGT | CACAGAAAAG | CATCTTACGG | ATGGCATGAC | AGTAAGAGAA | TTATGCAGTG |
| | AACCAACTCA | TGAGTGGTCA | GTGTCTTTTC | GTAGAATGCC | TACCGTACTG | TCATTCTCTT | AATACGTCAC |

FIG.\_48F

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TCTTTTTCCG TCGATGGTTG AGAAAAGGC TTAGGCCACC AATCCGGTGG TTCCACTGAG AGACGACGAA ATTTAAAAGG AAGGTGACTC TGAGCGTGGG TTAAGCATTG TTGATACCTA CTTGCTTTAT CTGTCTAGCG ACTCTATCCA CGGAGTGACT AATTCGTAAC TAAATTTTCC TCTGCTGCTT GCTTCCTCGA AACGTTGCGC AAACTATTAA CGGTATGGTT TGCTGCTCGC ACTGTGGTGC TACGGACATC GTTACCGTTG TTGCAACGCG TTTGATAATT AAGTTGCAGG CTCCGCCTAT TTCAACGTCC CGACTATITA GACCTCGGCC ACTCGCACCC TACACGACGG ATGTGCTGCC GCTGAATGAA CGACTTACTT CGAAGGAGCT CATCGGCATC AGCTACCAAC GTAGCCGTAG GCATCAATAG TGAGATAGGT GCCTCACTGA TTCATTTTA AAGTAAAAAT TGAGTTTTCG TACTGGTTTT AGGGAATTGC ACTCAAAAGC GACGCGCATT GAGGCGGATA CTGGAGCCGG CTGCGCGTAA ATCGGAGGAC CGTAGTTATC CCCTTGGCCT TAGCCTCCTG GGGAACCGGA GGCCTAGTTC CTAAATTTTG TCCCTTAACG GAAGAACTCT AGGAAAAAA CCGGATCAAG CCAAATACTG TCCTTCTAGT CGAAGTCGTC TCGCGTCTAT GGTTTATGAC AGGAAGATCA CCAACTTACT TCTGACAACG CAATGGCAAC GCTGATAAAT CCTCCCGTAT GGAGGGCATA GATTTAAAAC TCCTTTTTT AGACTGGATG TTGTTAATTA TCTGACCTAC GAACTAGCAA GGTTGAATGA AGACTGTTGC CTTGATCGTT AAACCACCGC TACCAGCGGT GGTTTGTTTG GACAGATCGC ATGACCAAAA TTTGGTGGCG ATGGTCGCCA CCAAACAAAC AACAATTAAT CTGGTTTATT GACCAAATAA ACTTTAGATT CTTCTTGAGA ACATTGAGCG ATGCCTGTAG CTACCATTCG TGAAATCTAA GATGGTAAGC TGTAACTCGC GCTTCAGCAG AGCGCAGATA AGATCCTTTT TGATAATCTC TCTAGGAAAA ACTATTAGAG GAACGAAATA TGAGTATATA ATCAAAGGAT TAGTTTCCTA GACCAAGTTT ACTCATATAT ACCCCCTAGT TGACACCACG CGAAGGGCCG CECTCGCCC TTCCGGCTGG AGTAACGTCG TGACCCCGGT CATGAGTGAT AACACTGCGG GCTTCCCGGC GCGAGCCGGG AAGGCCGACC ACTGGGGCCA GTACTCACTA TTGTGACGCC TGGGGGATCA CGTAGAAAG GCATCTTTTC AACTATGGAT CTGGTTCAAA TCATTGCAGC AACGTGTTGT GCCATACCAA ACGACGAGCG CTGGCGAACT ACTTACTCTA TGAATGAGAT TTGCACAACA AGAGCGCCAT GCAAACAAAA AAGGTAACTG TTCCATTGAC TCTCGCGGTA GGAGTCAGGC CCTCAGTCCG GTAACTGTCA CGTCAGACCC GCAGTCTGGG CGTTTGTTTT CTGCCATAAC TTGGCGAAAA ACCACTTCTG CATTGACAGT ATCTAGGTGA TAGATCCACT GACGGTATTG GACCGCTTGA TGGTGAAGAC AACCGCTTTT 3641 3711 3781 3851 3921 3991 4061 3501 3571 3291 3361 3431

FIG.\_48G

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| 4131 | ACTTCAAGAA
TGAAGTTCTT | CTCTGTAGCA
GAGACATCGT | CCGCCTACAT
GGCGGATGTA | ACCTCGCTCT
TGGAGCGAGA | GCTAATCCTG
CGATTAGGAC | TTACCAGTGG
AATGGTCACC | CTGCTGCCAG
GACGACGGTC |
|------|--------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 4201 | TGGCGATAAG
ACCGCTATTC | TCGTGTCTTA
AGCACAGAAT | CCGGGTTGGA
GGCCCAACCT | CTCAAGACGA
GAGTTCTGCT | TAGTTACCGG
ATCAATGGCC | ATAAGGCGCA
TATTCCGCGT | GCGGTCGGGC |
| 4271 | TGAACGGGGG | GTTCGTGCAC
CAAGCACGTG | ACAGCCCAGC
TGTCGGGTCG | TTGGAGCGAA
AACCTCGCTT | CGACCTACAC
GCTGGATGTG | CGAACTGAGA
GCTTGACTCT | TACCTACAGC
ATGGATGTCG |
| 4341 | GTGAGCTATG
CACTCGATAC | GTGAGCTATG AGAAAGCGCC
CACTCGATAC TCTTTCGCGG | ACGCTTCCCG
TGCGAAGGGC | AAGGGAGAAA
TTCCCTCTTT | GGCGGACAGG
CCGCCTGTCC | TATCCGGTAA
ATAGGCCATT | GCGGCAGGGT
CGCCGTCCCA |
| 4411 | CGGAACAGGA
GCCTTGTCCT | GAGCGCACGA | GGGAGCTTCC
CCCTCGAAGG | AGGGGGAAAC
TCCCCCTTTG | GCCTGGTATC
CGGACCATAG | TTTATAGTCC
AAATATCAGG | TGTCGGGTTT
ACAGCCCAAA |
| 4481 | CGCCACCTCT
GCGGTGGAGA | GACTTGAGCG
CTGAACTCGC | TCGATTTTTG
AGCTAAAAAC | TGATGCTCGT
ACTACGAGCA | CAGGGGGCG | GAGCCTATGG
CTCGGATACC | AAAAACGCCA
TTTTTGCGGT |
| 4551 | GCAACGCGGC | CTTTTTACGG
GAAAAATGCC | TTCCTGGCCT
AAGGACCGGA | TTTGCTGGCC
AAACGACCGG | TTTTGCTCAC
AAAACGAGTG | ATGTTCTTTC
TACAAGAAAG | CTGCGTTATC
GACGCAATAG |
| 4621 | CCCTGATTCT
GGGACTAAGA | GTGGATAACC
CACCTATTGG | GTATTACCGC
CATAATGGCG | CTTTGAGTGA
GAAACTCACT | GCTGATACCG
CGACTATGGC | CTCGCCGCAG | CCGAACGACC
GGCTTGCTGG |
| 4691 | GAGCGCAGCG
CTCGCGTCGC | AGTCAGTGAG
TCAGTCACTC | CGAGGAAGCG
GCTCCTTCGC | GAAGAGCGCC
CTTCTCGCGG | CAATACGCAA
GTTATGCGTT | ACCGCCTCTC
TGGCGGAGAG | CCCGCGCGTT |
| 4761 | GGCCGATTCA
CCGGCTAAGT | TTAATGCAGC
AATTACGTCG | TGGCACGACA | GGTTTCCCGA
CCAAAGGGCT | CTGGAAAGCG
GACCTTTCGC | GGCAGTGAGC
CCGTCACTCG | GCAACGCAAT
CGTTGCGTTA |
| 4831 | TAATGTGAGT
ATTACACTCA | TAGCTCACTC
ATCGAGTGAG | ATTAGGCACC
TAATCCGTGG | CCAGGCTTTA
GGTCCGAAAT | CACTTTATGC
GTGAAATACG | TTCCGGCTCG
AAGGCCGAGC | TATGTTGTGT
ATACAACACA |

FIG.\_48H

"Manipulation of the Phenolic Acid Control Digestibility of Plant Cell Walls by Target Expression of Genes Encoding Cell Wall..." eog.o70202 SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 145 of 154

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CCTTAACACT CGCCTATTGT TAAAGTGTGT CCTTTGTCGA TACTGGTACT AATGCGGTTC GCGCGTTAAT GGAATTGTGA GCGGATAACA ATTTCACACA GGAAACAGCT ATGACCATGA TTACGCCAAG CGCGCAATTA

4901

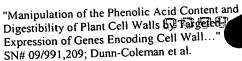
Ncol

KpnI 11111

ACCCTCACTA AAGGGAACAA AAGCTGGGTA C TGGGAGTGAT TTCCTTGTT TTCGACCCAT G

4971

BSSHII



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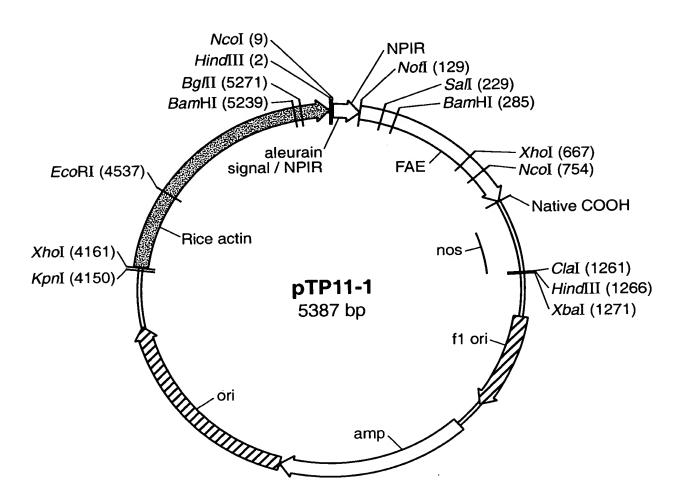


FIG.\_49A

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targete Expression of Genes Encoding Cell Wall. SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 147 of 154

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AAGCTTACCA TGGCCCACGC CCGCGTCCTC CTCCTGGCGC TCGCCGTGCT GGCCACGGCC GCCGTCGCCG Noti **~**

TCCGAAGACC TCTACAGCCG TTTAGTCGAA ATGGCCACTA TCTCCCAAGC TGCCTACGCC ຜ GACCGCGCGG ĸ А GCCCGTCACC H > Д GCCGACTCCA ACCCGATCCG ĸ ρι Z ß А CICCICCIIC А ß 더 GCAGGGCATC TCGCCTCCTC Ø Ŋ 4 71 141

Sall

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Ü GACATTAACG TTCTCAAACT Н O Ø GACCTGTGCA ACATTCCGTC GACTATTATC AAGGGAGAGA AAATTTACAA Z × 闰 Ö H Ø Z U BamHI 211

CGCCCAGCTG TCTGCGACAT ACGACAACAT CCGCCTGTAC ACCTTCGGCG AACCGCGCAG CGGCAATCAG GCCAGTATCC GGACTACGCG CTGACCGTGA CCGGCCACKC CCTCGGCGCC TCCCTGGCGG CACTCACTGC GATGGATCCT CCGCGACGAC AGCAGCAAAG AAATAATCAC CGTCTTCCGT GGCACTGGTA GTGATACGAA TCTACAACTC GATACTAACT ACACCCTCAC GCCTTTCGAC ACCCTACCAC AATGCAACGG TTGTGAAGTA CACGGTGGAT ATTATATTGG ATGGGTCTCC GTCCAGGACC AAGTCGAGTC GCTTGTCAAA CAGCAGGTTA H Ŋ Ü H Ü 闰 œ 4 O Ē O X H G Ы Н H 闰 > × Ø Ø × H Z × × Y Y Ö 222222 ø Ü 0 421 491 561 281 351

TTCCGGGTCA GACGCAGTAT GCCTTCGCGT CGTACATGAA CGATGCCTTC CAAGCCTCGA GCCCAGATAC Ŋ Ø 4 А Σ 4 631

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"Manipulation of the Phenolic Acid Content a Digestibility of Plant Cell Walls by an getter Expression of Genes Encoding Cell Wall.. SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 148 of 154

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GATAGAAAAC AAAATATAGC GCGCAAACTA GGATAAATTA TCGCGCGGG TGTCATCTAT GTTACTAGAT TGCAGCACAT TTGCGCAGCC CGCGCAGCGT CGCCACGTTC TTACGGCACC CGGTTTTTCG ACTCAACCCT TGTAATGCAT GACGTTATTT ATGAGATGGG TTTTTATGAT TAGAGTCCCG CAATTATACA TTTAATACGC CGCGCTCACT CTCATGCCAA CGACGGCATC CCAAACCTGC CCCCGGTGGA GCAGGGGTAC GCCCATGGCG GTGTAGAGTA CATITCAGCC TCCCCGAGIG TACCAGGAAA GAIGGAIGIC CIGGAGAGGG GGCCGCGIAA TCGTTCAAAC ATTTGGCAAT AAAGTTTCTT AAGATTGAAT GTCTTGCGAT GATTATCATA TAATTTCTGT TGAATTACGT TAAGCATGTA ATAATTAACA CTGGAGCGTT GATCCTTACA GCGCCCAGAA CACATTTGTC TGCACTGGGG ATGAAGTGCA GTGCTGTGAG GCCCAGGGCG GACAGGGTGT GAATAATGCG CACACGACTT ATTTTGGGAT GACGAGCGGA GCCTGTACAT ATTTAGTGCT CTGGAACAAC TCGTATTACG TTAATCGCCT CTTCCTTTCT CCCTGATAGA TTCCCAACAG 1111111 Ð CTATAGTGAG TAGGGTTCCG CGCGGCGGGT TGGGCCATCG TTGTTCCAAA GTTACCCAAC CCGATCGCCC GCTTTCTTCC HTTY CGGTGGAGCT CCAATTCGCC GAGGCCCGCA GCGCATTAAG CGCTCCTTTC GGGCTCCCTT GTTCACGTAG TAGTGGACTC GTGACTGGGA AAACCCTGGC D P Y S A Q N CCCTGTAGCG TCTAAATCGG TAGGGTGATG CGTTCTTTAA TAATAGCGAA CCACTGAAGG ATGAGCTGTA AAGAAGCAGA CCCTAGCGCC N N A > 5 0 AAAACTTGAT CGATAAGCTT CTAGAGCGGC ATGGGACGCG CTTGCCAGCG CCCGTCAAGC TTACAACGTC CCAGCTGGCG TTGGAGTCCA H D Q ტ ტ HindIII CCTGTTGCCG GGCCGTCGTT CCCCTTTCG **IGAATGGCGA** GACCGCTACA GCCGGCTTTC TCGACCCCAA CCCTTTGACG GGTGATCAGT 751 701 771 841 981 1191 1401 1471 541 611 681 1051 1121

NCOI

TCTTACGGAT GGCATGACAG TAAGAGAATT

TACATCGAAC TGAGCACTTT TCGCCGCATA

ACGAGTGGGT TTTCCAATGA AGCAACTCGG

AGTTGGGTGC CGAAGAACGT

GCTGAAGATC

GTTTTCGCCC CCGTATTGAC

TATTCCCTTT

AACCCTGATA

2031 2101 2171 2241

TTTGCGGCAT

AATGCTTCAA

GCCGGGCAAG CAGAAAAGCA

TCACCAGTCA

2381

2311

TGTTTTGCT

CGGTATTATC

GGTTGAGTAC

CACTATTCTC

GCCATAACCA

AGTAAAAGAT ATCCTTGAGA

ATGAGACAAT GTGTCGCCCT

AATGAGCTGA TTTTCGGGGA

TTGGTTAAAA TAGGTGGCAC GTATCCGCTC CAACATTTCC CGCTGGTGAA CAGCGGTAAG CTATGTGGCG AGAATGACTT ATGCAGTGCT

TTTCGGCCTA GCTTACAATT ATTCAAATAT TATGAGTATT CACCCAGAAA TGGATCTCAA TAAAGTTCTG

ATTTGCCGA AAATATTAAC TTCTAAATAC AAAGGAAGAG

TTTATAGGG AATTTTAACA

ATTCTTTGA ATTTAACGCG GAACCCCTAT

ATCTCGGTCT TTTAACAAAA AATGTGCGCG

1821

891 1961

TTGTTTATT TAATATTGAA TTTGCCTTCC "Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targeted Expression of Genes Encoding Cell Wall..."

SN# 09/991,209; Dunn-Coleman et al.

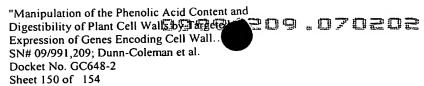
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| CACTGCGGCC AACTTACTTC
GGGGATCATG TAACTCGCCT
ACACCACGAT GCCTGTAGCA | CACTGCGGCC AACTTACTTC GGGGATCATG TAACTCGCCT ACACCACGAT GCCTGTAGCA | | TGACAACGAT
TGATCGTTGG
ATGGCAACAA | | CGGAGGACCG | AAGGAGCTAA
TGAATGAAGC
ACTATTAACT | CCGCTTTTTT CATACCAAAC GGCGAACTAC |
|---|---|-----------|--|--------------------------|--------------------------|---|----------------------------------|
| TTCCCGGCAA | TTCCCGGCAA | CAATTA | ATAG | ACTGGATGGA
TGATAAATCT | GGCGGATAAA | GTTGCAGGAC | CACTTCTGCG |
| ATTGCAGCAC TGGGGCCAGA TGGTAAGCCC CTATGGATGA ACGAAATAGA CAGATCGCTG | TGGGGCCAGA ACGAATAGA | TGGTAAG | CCC | TCCCGTATCG | TAGTTATCTA | CACGACGGGG | AGTCAGGCAA
AACTGTCAGA |
| CCAAGITIAC ICAIAIAIAC ITIAGAIIGA
AICCIIIIIG AIAAICICAI GACCAAAAIC | TCATATATAC | TTTAGAT'I | GA | TTTAAAACTT | CATTTTTAAT
AGTTTTCGTT | TTAAAAGGAT | CTAGGTGAAG |
| CAAAGGATCT | CAAAGGATCT | TCTTGAG | ATC | CTTTTTTCT | GCGCGTAATC | TGCTGCTTGC | AAACAAAAA |
| ACCACCGCTA CCAGCGGTGG TTTGTTTGCC
TTCAGCAGAG CGCAGATACC AAATACTGTC | CCAGCGGTGG | TTTGTTT | ည်း | GGATCAAGAG | CTACCAACTC | TTTTCCGAA | GGTAACTGGC
TTCAAGAACT |
| GCCTACATAC | GCCTACATAC | CICGCIC | TGC | TAATCCTGTT | ACCAGTGGCT | GCTGCCAGTG | GCGATAAGTC |
| GTGTCTTACC GGGTTGGACT CAAGACGATA | GGGTTGGACT | CAAGACG | ATA | GTTACCGGAT | AAGGCGCAGC | GGTCGGGCTG | AACGGGGGGT |
| GCTTCCCGAA | GCTTCCCGAA | GGGAGAA | AGG | CGGACAGGTA | TCCGGTAAGC | GGCAGGGTCG | GAACAGGAGA |
| GAGCTTCCAG | GAGCTTCCAG | GGGGAAA | ည္သည္ | CIGGIAICTI | TATAGTCCTG | TCGGGTTTCG | CCACCTCTGA |
| GATTTTTGTG | GATTTTGTG | ATGCTCG | TCA
E | GGGGGGCGGA | GCCTATGGAA | AAACGCCAGC | AACGCGGCCT |
| IIITACGGII CCIGGCCIII IGCIGGCCII
GGATAACCGI ATTACCGCCI TIGAGIGAGC | ATTACCGCCT | TECTEGEC | AGC | TGATACCGCT | GITCITICCI | GAACGACCGA | CTGATTCTGT
GCGCAGCGAG |
| TCAGTGAGCG AGGAAGCGGA AGAGCGCCCA | AGGAAGCGGA | AGAGCGC | CA | ATACGCAAAC | CGCCTCTCCC | CGCGCGTTGG | CCGATTCATT |
| GCACGACAGG | GCACGACAGG | TTTCCCG | \CT | GGAAAGCGGG | CAGTGAGCGC | AACGCAATTA | ATGTGAGTTA |
| TAGGCACCCC | TAGGCACCCC | AGGCTTT | ACA | CTTTATGCTT | CCGGCTCGTA | TGTTGTGTGG | AATTGTGAGC |
| GGATAACAAT TTCACACAGG AAACAGCTAT | TTCACACAGG | AAACAGCI | ľAT | GACCATGATT | ACGCCAAGCG | CGCAATTAAC | CCTCACTAAA |
| KpnI | KpnI | , | × { | XhoI | | | |
| GGGAACAAAA GCTGGGTACC GGGCCCCCCC | GCTGGGTACC | ညညညာဗဗ | ည္ပ | TCGAGGTCAT | TCATATGCTT | GAGAAGAGAG | TCGGGATAGT |
| CCAAAATAAA ACAAAGGTAA GATTACCTGG | ACAAAGGTAA | GATTACC | ට්ට් | TCAAAAGTGA | AAACATCAGT | TAAAAGGTGG | TATAAGTAAA |
| TAAAAGGTGG | TAAAAGGTGG | CCCAAAGI | GA | AATTTACTCT | TTTCTACTAT | TATAAAAATT | GAGGATGTTT |
| TTGATACGIC | TTGATACGTC | ATTTTTG | AT | GAATTGGTTT | TTAAGTTTAT | TCGCGATTTG | GAAATGCATA |
| TCTGTATTTG AGTCGGTTTT TAAGTTCGTT | AGTCGGTTTT | TAAGTTCG | Ħ | GCTTTTGTAA | ATACAGAGGG | ATTTGTATAA
ECORI | GAAATATCTT |
| | | 1 | [| | | 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 | |
| ATATGCTAAT | ATATGCTAAT | TTGACAT | TA! | TTTGAGAAA | AATATATAT | CAGGCGAATT | CCACAATGAA |
| ATTAAAATAG | ATTAAAATAG | CTTGCCC | ဗ | TIGCAGCGAT | GGGTATTTT | TCTAGTAAAA | TAAAAGATAA |
| ACTTAGACTC AAAACATTTA CAAAAACAAC | AAAACATTTA | CAAAAAC | ₩ | CCCTAAAGTC | CTAAAGCCCA | AAGTGCTATG | CACGATCCAT |

FIG.\_49D



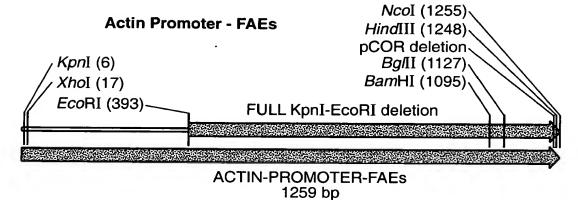
150 / 154

| r cregereres arcritegee tregtagiti gegrege | CC CCCTCCCCT CCGCCGCCGC CGGTAACCAC CCCGCCCTC | AGCAAGCCCA GCCCAACCCA ACCCAACCCA ACCCACCC |
|---|--|---|
| | er ctcggtctcg atctttggcc ttggtagttt gggtgggcga | AGCAAGCCCA GCCCAACCCA ACCCACCCCC GTGCAGCCAA CTGGCAAATA GTCTCCACCC CCGGCCACTAT CACCGTGAGCACC ACCGCACGTC TCGCAGCCAA AAAAAAAA AGAAAGAAAA AAAAAAAA AGAAAAAA |
| CCCTCCCCT CCGCCGCCGC CGGTAACCAC CCCGCCCC | | AGCAAGCCCA GCCCAACCCA ACCCAACCCA GTGCAGCCAA CTGGCAAATA GTCTCCACCC CCGGCACTAT CACCGTGAGCAAAA AGAAAGAAAA AGGAAAAA AGGAAAAA AGGAAAAAA |
| 1 TCCCCCCAAC CCTACCACCA CCACCACCAC CACCTCC | TCTCCTCCCA TCCCCCCAAC CCTACCACCA CCACCACCAC CACCTCCTCC | AGCAAGCCCA GCCCAACCCA ACCCAACCCA GTGCAGCCAA CTGGCAAATA GTCTCCACCC CCGGCACTAT CACCGTGAGT TGTCCGCACC ACCGCACGTC TCGCAGCCAA AAAAAAAAA AGAAAGAAAA AAAAGAAAA AAAAGAAAA AAAAGAAAA AAAAGAAAA AAAAGAAAA GAAAAAA |
| CGGCCCTCCC TCCGCTTCCA AAGAAACGCC CCCCATCO A TCCCCCCAAC CCTACCACCA CCACCACCA CACCTCCO CCCTCCCCCT CCGCCGCCGC CGGTAACCAC CCCGCCCC | ICC CGGCCCTCCC TCCGCTTCCA AAGAAACGCC CCCCATCGCC ACTATATACA TACCCCCCCC ICA TCCCCCCCAAC CCACCACCAC CACCTCCTCC CCCTCGCTG CCGGACGACG | CA GCCCAACCCA ACCCAACCCA ACCCACCCCA GTGCAGCCAA (AT CACCGTGAGT TGTCCGCACC ACCGCACGTC TCGCAGCCAA A |
| A GAAAAACAGC AGGTGGGTCC GGGTCGTGGG GGCCGGAAACGCC CCCCATCCA TCCCCCCCAAC CCTACCACCA CCACCACCA CACCACCACCACCACCACCACC | AA GAAAAACAGC AGGTGGGTCC GGGTCGTGGG GGCCGGAAAA
ACC CGGCCCTCCC TCCGCTTCCA AAGAAACGCC CCCCATCGCC
ACA TCCCCCCAAC CCTACCACCA CCACCACCAC CACCTCCTCC | CA GCCCAACCCA ACCCAACCCA ACCCACCCCA GTGCAGCCAA C |
| CACCGTGAGT TGTCCGCACC ACCGCACGTC TCGCAGCGAGAAAAACAGC AGGTGGGTCC GGGTCGTGGG GGCCGGAACGCC CCCCATCGA TCCCCCCCAAC CCACCACCA CCCCCCACCACCACCACCA | AT CACCGTGAGT TGTCCGCACC ACCGCACGTC TCGCAGCCAAAAAAAAAA | |

FIG.\_49E

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Target Company Com

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KpnI XhoI 1 GGTACCGGGC CCCCCTCGA GGTCATTCAT ATGCTTGAGA AGAGAGTCGG GATAGTCCAA AATAAAACAA CCATGGCCCG GGGGGGAGCT CCAGTAAGTA TACGAACTCT TCTCTCAGCC CTATCAGGTT TTATTTTGTT 71 AGGTAAGATT ACCTGGTCAA AAGTGAAAAC ATCAGTTAAA AGGTGGTATA AGTAAAATAT CGGTAATAAA TCCATTCTAA TGGACCAGTT TTCACTTTTG TAGTCAATTT TCCACCATAT TCATTTTATA GCCATTATTT 141 AGGTGGCCCA AAGTGAAATT TACTCTTTTC TACTATTATA AAAATTGAGG ATGTTTTGTC GGTACTTTGA TCCACCGGGT TTCACTTTAA ATGAGAAAAG ATGATAATAT TTTTAACTCC TACAAAACAG CCATGAAACT 211 TACGTCATTT TTGTATGAAT TGGTTTTTAA GTTTATTCGC GATTTGGAAA TGCATATCTG TATTTGAGTC ATGCAGTAAA AACATACTTA ACCAAAAATT CAAATAAGCG CTAAACCTTT ACGTATAGAC ATAAACTCAG 281 GGTTTTTAAG TTCGTTGCTT TTGTAAATAC AGAGGGATTT GTATAAGAAA TATCTTTAAA AAACCCATAT CCAAAAATTC AAGCAACGAA AACATTTATG TCTCCCTAAA CATATTCTTT ATAGAAATTT TTTGGGTATA EcoRI 351 GCTAATTTGA CATAATTTTT GAGAAAAATA TATATTCAGG CGAATTCCAC AATGAACAAT AATAAGATTA CGATTAAACT GTATTAAAAA CTCTTTTTAT ATATAAGTCC GCTTAAGGTG TTACTTGTTA TTATTCTAAT 421 AAATAGCTTG CCCCCGTTGC AGCGATGGGT ATTTTTTCTA GTAAAATAAA AGATAAACTT AGACTCAAAA TTTATCGAAC GGGGCAACG TCGCTACCCA TAAAAAAGAT CATTTTATTT TCTATTTGAA TCTGAGTTTT 561 AACCCAACCC AACCCAACCC ACCCCAGTGC AGCCAACTGG CAAATAGTCT CCACCCCCGG CACTATCACC TTGGGTTGGG TTGGGTTGGG TGGGGTCACG TCGGTTGACC GTTTATCAGA GGTGGGGGCC GTGATAGTGG GTGAGTTGTC CGCACCACCG CACGTCTCGC AGCCAAAAAA AAAAAAAGAA AGAAAAAAAA GAAAAAGAAA 701 AACAGCAGGT GGGTCCGGGT CGTGGGGGCC GGAAAAGCGA GGAGGATCGC GAGCAGCGAC GAGGCCCGGC TTGTCGTCCA CCCAGGCCCA GCACCCCCGG CCTTTTCGCT CCTCCTAGCG CTCGTCGCTG CTCCGGGCCG



"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls of Plant Cell Walls... Expression of Genes Encoding Cell Wall... SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 152 of 154

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| 771 | CCTCCCTCCG | CTTCCAAAGA | AACGCCCCCC | ATCGCCACTA | TATACATACC | CCCCCTCTC | CTCCCATCCC |
|------|------------|------------|--------------------------|------------|------------|------------|------------|
| | GGAGGGAGGC | GAAGGTTTCT | TTGCGGGGGG | TAGCGGTGAT | ATATGTATGG | GGGGGGAGAG | GAGGGTAGGG |
| | | | | | | | |
| 841 | CCCAACCCTA | CCACCACCAC | CACCACCACC | TCCTCCCCCC | TCGCTGCCGG | ACGACGAGCT | CCTCCCCCCT |
| | GGGTTGGGAT | GGTGGTGGTG | GTGGTGGTGG | AGGAGGGGG | AGCGACGGCC | TGCTGCTCGA | GGAGGGGGA |
| | | | | | | | |
| 911 | CCCCCTCCGC | CGCCGCCGGT | AACCACCCCG | CCCCTCTCCT | CTTTCTTTCT | CCGTTTTTTT | TTTCGTCTCG |
| | GGGGGAGGCG | GCGGCGGCCA | TTGGTGGGGC | GGGGAGAGGA | GAAAGAAAGA | GGCAAAAAAA | AAAGCAGAGC |
| | | | | | | | |
| 981 | GTCTCGATCT | TTGGCCTTGG | TAGTTTGGGT | GGGCGAGAGC | GGCTTCGTCG | CCCAGATCGG | TGCGCGGGAG |
| | CAGAGCTAGA | AACCGGAACC | ATCAAACCCA | CCCGCTCTCG | CCGAAGCAGC | GGGTCTAGCC | ACGCGCCCTC |
| | | | | | | | |
| | | | | | BamHI | | |
| | | | | | ~~~~ | | |
| 1051 | GGGCGGGATC | TCGCGGCTGG | CGTCTCCGGG | CGTGAGTCGG | CCCGGATCCT | CGCGGGGAAT | GGGGCTCTCG |
| | CCCGCCCTAG | AGCGCCGACC | GCAGAGGCCC | GCACTCAGCC | GGGCCTAGGA | GCGCCCCTTA | CCCCGAGAGC |
| | | | | | | | |
| | BglI | Ι | | | | | |
| | ~~~~ | ~~ | | | | | |
| 1121 | GATGTAGATC | TTCTTTCTTT | CTTCTTTTTG | TGGTAGAATT | TGAATCCCTC | AGCATTGTTC | ATCGGTAGTT |
| | CTACATCTAG | AAGAAAGAAA | GAAGAAAAAC | ACCATCTTAA | ACTTAGGGAG | TCGTAACAAG | TAGCCATCAA |
| | | | | | | | |
| | | | | | | Hind: | III NcoI |
| | | | | | | | |
| | | | | | | | |
| 1191 | TTTCTTTTCA | | CAAATGCAGC
GTTTACGTCG | | | | |

KpnI-EcoRI - deletion underlined and restored NCO site in bold in vectors pJQ4.9, pJQ3.2 and pJO6.3.

FIG.\_50B

"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by larger Plant Cell Walls by larger Plant Cell Walls."

Expression of Genes Encoding Cell Wall...

SN# 09/991,209; Dunn-Coleman et al.

Docket No. GC648-2

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ALEURAIN\_d I t d NPIR (Ap plast) Structur and Sequ nc



ALEURAIN-NPIR-DEL 93 bp

+1 MAHARVLLLALAVLATAAVA
HindIII NcoI

1 AAGCTTACCA TGGCCCACGC CCGCGTCCTC CTCCTGGCGC TCGCCGTGCT GGCCACGGCC GCCGTCGCCG
TTCGAATGGT ACCGGGTGCG GGCGCAGGAG GAGGACCGCG AGCGGCACGA CCGGTGCCGG CGGCAGCGGC

+1 V A S S R A A

NotI

71 TCGCCTCCTC CCGCGCGGCC GCC
AGCGGAGGAG GGCGCGCCGG CGG

FIG.\_51



"Manipulation of the Phenolic Acid Content and Digestibility of Plant Cell Walls by Targets Company Co SN# 09/991,209; Dunn-Coleman et al. Docket No. GC648-2 Sheet 154 of 154

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SEE1 (Senescence enhanced) PROMOTER sequence

| 1 | CATGGGCCAG | GTATAATTAT | GGGATATCTC | AAGCAAATAA | TCGAAATATC | ACCATTGGCT | ACAATATCTG |
|-----|------------|------------|------------|------------|------------|------------|------------|
| | | PstI | | | XbaI X | KbaI | |
| | | ~~~~ | ~~ | | ~~~~~~ | ~~~~ | |
| 71 | AGCTCCGAGT | TCTGACTGCA | GTCTGGATGA | CGCGTGTTGT | ATCTAGAACT | CTAGATAGCA | CAGCCACAGC |
| 141 | ACCTACAGGA | GTGCGACACT | TGTGGACTGT | AGTAGTGTTG | GAGACGGAGC | TCTTTCCTAC | CTCCTGACGT |
| 211 | TGCCGCCGTT | GTCCATTCCA | ACGGCATCAC | TCTCAACCAA | TCACGCGCTC | CCAACAAAAT | ATCGTCCCCC |
| 281 | ATGTCTTGGC | GGAGAGAGAG | TACATACATG | CTGTCGCGCC | GTTTTTGTCT | GAATCTCGCT | TCCACTGGCC |
| | | SmaI | | | | | |
| | | ~~~~~~ | | | | | |
| 351 | AATCAGCTCA | GCTCCCGGGA | GCTCACTCAT | TCAAGATCCC | ATCGTCGTCG | TCACCCCTGG | CGTCATGGGA |
| 421 | TGGAAAAGAA | CCTCCGTTGC | TCGGATGAGT | CAGCCATATC | CCCGAACAGA | GTACTGCAAG | ATAACCCAAT |
| | | | Spl | ηΙ | | | |
| | | | ~~~ | -~~ | | | |
| 491 | TCAGATTCCC | CCAATAGAGA | AAGTATAGCA | TGCTTTCGGG | TTTTGTTTGG | CTTAATTGAC | TTTATTTTTG |
| 561 | TTGGAGTTGA | ATGCTGATTT | GTTGTGTAAA | ATGCCCAACC | ATCTGAATAT | CGAGACGGAT | AATAGGCTGG |
| 631 | CTAATTAATT | TATAGCAAGA | TTCTGTAGTG | CACATCGCAA | ATATCTTTCT | GGGCATTACA | GCTGGAGGCT |
| | | Ps | stI | | | | |
| | | ~~. | | | | | |
| 701 | TCATCAGCCT | GAAACACTCT | GCAGAGCCTG | AAGCAAGTGG | TGAAGCGTGG | CGATGAGATG | GGTATAAAAC |
| 771 | CCCCGGCACC | GGGACGCGAG | CTCCCGCCTA | CCAGTACCAT | CTCGCCTCGC | TCCCCCTGCC | GGACGACCCA |
| 841 | GTAAAATACT | GTTGCCCACT | CGCCGGCGAG | ATG | | | |
| | | | | | | | |

FIG.\_52

SEE1 (Senescence enhanced) PROMOTER plus vacuolar aleurain SIGNAL/NPIR sequence

| 1 | CATGGGCCAG | GTATAATTAT
PstI | GGGATATCTC | AAGCAAATAA | | ACCATTGGCT
(bal | ACAATATCTG |
|-----|--------------------|--------------------|------------|---------------|------------|--------------------|------------|
| | | ~~~~ | ~~ | | ~~~~~~ | | |
| 71 | AGCTCCGAGT | TCTGACTGCA | GTCTGGATGA | CGCGTGTTGT | ATCTAGAACT | CTAGATAGCA | CAGCCACAGC |
| 141 | | | TGTGGACTGT | | | | |
| 211 | | | ACGGCATCAC | | | | |
| 281 | ATGTCTTGGC | GGAGAGAGAG
SmaI | TACATACATG | CTGTCGCGCC | GTTTTTGTCT | GAATCTCGCT | TCCACTGGCC |
| | | ~~~~~ | | | | max 0000maa | 000010000 |
| 351 | | | GCTCACTCAT | | | | |
| 421 | TGGAAAAGAA | CCTCCGTTGC | TCGGATGAGT | | CCCGAACAGA | GTACTGCAAG | ATAACCCAAT |
| | | | Spl | nI | | | |
| | | | ~~~ | | | | mmma mmmmm |
| 491 | | | AAGTATAGCA | | | | |
| 561 | | | GTTGTGTAAA | | | | |
| 631 | CTAATTAATT | | TTCTGTAGTG | CACATCGCAA | ATATCTTTCT | GGGCATTACA | GCTGGAGGCT |
| | | Pa | stI | | | | |
| | | ~~. | ~~~~ | | | | GG=1=111G |
| 701 | | | GCAGAGCCTG | | | | |
| 771 | CCCCGGCACC | GGGACGCGAG | CTCCCGCCTA | | | | |
| | | | | M A H (| | F L A | L A V L |
| 841 | GTAAAATACT | GTTGCCCACT | CGCCGGCGAG | ATGGCCCACG | GCCGCATCCT | CTTCTTGGCG | CTCGCCGTCT |
| | | | | | | | BasHII |
| | | | | | | n n 17 (| NotI |
| | - A T A | AVA | | L A D S | N P I | | F E R A |
| 911 | TGGCCACCGC
NotI | CGCGGTGGCC | GCCGCATCNT | TGGCGGACTC | CAACCCGATC | CGGCCCGTCA | CCGAGCGCGC |
| | ~~~~~ | | | | | | |
| 001 | · A A | | FIA | G53 | | | |
| 981 | GGCCGCC | | , , | U. _UU | | | |